TEACHING GEOGRAPHY

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To Neville Scarfe
who taught one of us and inspired us both

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has been called a point of view We see it as the integrating subject, which draws together and inter relates the facts about places We see geography in school as a process of discovery, whereby children find for themselves the richness and fascinating complexity of the world in which they live This is shown above all in the sample lessons, which express our whole approach to the teaching of the subject

A primary ability which the young teacher must develop is to lead, inspire and control a class by means of lessons One secret of obtaining success—and order—in the classroom is by careful organisation and planning We give many examples of complete lesson units, planned in detail There are times, of course, when informal activities are going on, or when children are busy with their own individual studies, but a basic skill of the teacher is the delivering of a lesson While there is specialisation as in most secondary schools, there must be formal organisation While there are bells and timetables, there are lessons where teachers teach and children sometimes learn It is to beginners in the vital process of teaching that this book is directed

M L
B S R

CHAPTER I

WHY TEACH GEOGRAPHY?

WE ARE concerned in this book with the teaching of geography in secondary schools, and the main purpose of schools is to educate children We should be building upon sand, therefore, if we did not consider, however briefly, why we educate them It is all too easy in the momentum of everyday school life to forget the wider issues, and to devote attention solely to a subject Subject divisions are a way of organising the whole body of knowledge, and the purpose behind the teaching of any given subject in school is to educate We try in the following pages to present geography less as a subject to be imparted than as a process which, among others, furthers the ends of education

What are these ends? To answer this question properly would involve an attempt to summarise the whole history of education and the many philosophies upon which it has been based This is clearly impossible here There are many ends offered and debated, and the case for teaching geography does not rest upon any particular one A consideration of some recent views of the aims of education may assist the reader and enable us to make the point

Dewey's child centred education is perhaps a convenient starting point today, and we risk summarising his whole work as seeing education as a process of development 'Education is a process of living and not a preparation for future living'[1] Whitehead took an intellectual approach 'Education is the acquisition of the art of the utilisation of knowledge'[2] He also saw the developmental side 'The purpose of education is to stimulate and guide self development'[3] Nunn also was an individualist ' a scheme of education is ultimately to be valued by its success in fostering the highest degrees of individual excellence of which those submitted to it are capable'[4] In addition to having great respect for the individual, he saw education as a means of transmitting the cultural heritage The individualist schools were followed by the socialisers, Mannheim

and Clarke saw education as fulfilling its vital role by producing citizens and changing society

Peters[5] does not see education as having extrinsic ends 'The truth is that being worth while is part of what is meant by calling it education' 'Education implies the intentional bringing about of a desirable state of mind' 'A development of this is that to be educated implies caring about what is worth while, and being brought to care about it' His exposition of education as initiation follows 'With the mastery of basic skills the door is open to a vaster and more variegated inheritance Further differentiation develops as the boy becomes initiated more deeply into distinctive forms of knowledge ' This seems not dissimilar to Nunn's view of curriculum subjects as offering the 'tradition of intellectual activity and 'grand expressions of the human spirit' Claims for geography as a worthwhile study are certainly in harmony with it

Fortunately for us all these aims subsume the teaching of our subject, provided it is on anything but completely illiberal lines We do not need—nor could we—decide between philosophies Geography can be used as a vehicle for the child s development, to help him acquire the art of using knowledge or to learn something of his cultural heritage It is often claimed to be a necessary background to citizenship, and in our view it initiates children into a particular mode of thought Properly interpreted, the geography we describe here does not conflict with any of these aims To choose between them is to make a judgement of values or priorities which we leave to the individual teacher Whatever view of education he takes, he should be aware, as constantly as possible, of his ultimate purpose To forget this is at best to become narrow, at worst, to teach without thought

These philosophical considerations do not give geography specific support They have not denied our *raison d etre*, but they are so far only permissive Apologists for all subjects would claim qualities for them which justify inclusion in the timetable, and which contribute to whatever aim or definition of education they hold The only justification for geographical studies on any of these philosophical grounds would be to claim that geography offered a unique means of furthering any of their particular ends Thus far, we do not make this claim Let us, therefore, look at subjects from a more pragmatic viewpoint They exist at present as subjects How do they come to be included in the curriculum?

To review the development of subject divisions would be to

write another aspect of the history of education, indeed to probe the whole growth of man's knowledge The current divisions of the timetable came into existence for a variety of reasons and through a variety of pressures Historical, political, religious, economic and social factors are at work The ultimate control of education is not to be summarised in a sentence [6] We can detour discussion of this issue by saying that at present subjects are in the timetable because those in control of education believe them to be worthwhile The content of education is constantly under review, and teachers who believe in the value of their particular branch of knowledge in practice prepare an *ad hoc* defence of it The student who proposes to use geography as a means of education should have at least some knowledge of this and ensure that his defence is consistent with his chosen educational philosophy

Geography has not lacked its apologists We begin with Fairgrieve,[7] whose influence, perhaps more than that of any other individual, shaped the pattern of geography in British schools in the early part of this century He made two preliminary points, that we *ought* to know something about the world in which we live, and that geography pays This he developed as its need in commerce He recognised the economic need as subsidiary 'The real value of geography lies in the fact that it helps man to live, it helps man to place himself in the world, to learn his true position, and what are his duties' 'It enables us to understand other people, to some extent, by comparison with ourselves By a study of geography we are enabled to understand facts without a knowledge of which it is impossible to do our duty as citizens of this very confusing and contradictory world' 'There is a claim from geography for a place in the curriculum because we cannot have an education worth the name without geography' His definition of the purpose of education, upon which this last statement rests, was that it is to help people to earn a living, and to help them to live

There is some suggestion of a claim here that geography furthers international understanding, but this is later expressed in the more limited form of 'necessary background knowledge' His educational theory is clearly of the developmental school We give later an elaboration of the way geography offers means of development, but are more cautious about whether these processes are unique to it

Writing in 1951 Scarfe[8] said 'Within this broad framework it is

possible to define more closely the special functions of geography teaching in helping to equip children for life in the present-day world It can help to provide specific knowledge, it can teach certain skills, and it can develop certain attitudes . ' In a work sub titled 'Towards World Understanding' one would expect emphasis upon this latter His main claim under the last heading is 'an understanding of how the varied problems of peoples are related to differences in environment and through this understanding the development of an open minded attitude towards the problems . . of other peoples'. The other items refer to the way geography can assist consideration of current problems, and foster realisation of world interdependence and of the need for careful use of world resources

His more recent work[9] provides a claim on philosophical grounds for the teaching of geography. 'The concept of an autonomous discipline implies a subject . which has power within itself to make, to the sum total of human knowledge and understanding, its own unique and special contribution which is quite distinct from that of other disciplines . a discipline with a precise point of view, a clearly defined purpose, and a method of study peculiar to itself Geography is such a discipline ' 'The first and primary function of the school geographer is to discover if relationships exist between the distribution of man's life and work, and the distribution of non human conditions This is a task that no other discipline undertakes '

Briault and Shave[10] offer three clear points, phrased moderately in terms of hopes 'First, the subject will teach a content of connected fact, interesting, significant and culturally valuable Second, the subject will suggest the world view, upon the educational importance of which we may all agree Third, the subject will lend accuracy and reality to ideas of other people and other parts of the world, so that the world view shall be enlivened by a realistic appreciation of other lands ' They mention also the place of geography as a link between the natural sciences and the humanities, and that a good geographical training 'tends to induce the habit of looking for all sides of a problem and of anticipating the inter-relation of elements'

Gopsill[11] agrees that geographical knowledge is useful, but discounts the idea that geography makes for better international understanding on the grounds that 'in spite of much excellent geography teaching . the harmony we look for seems very little nearer' This appears to place a heavy responsibility upon

geography, and as he later remarks of the qualities implicit in international understanding 'These . . are more likely to be acquired from the general tone of the school and the ethical standards which prevail in it'

He sees geography as helping 'the all important fact that education is concerned with the personal development of children' 'The study of geography is a profitable one for children, not so much because it prepares them for this or for that, but because it can provide them with stimulating material which has immediate significance, and because it offers opportunities for keen intellectual exercise in the pursuit of the significant relationships between the various parts of its findings' By itself, this could apply to many subjects We must therefore consider his view of geography He speaks of subject matter which is full of meaning, which captures the imagination and awakens curiosity 'Many branches of science deal with these matters, geography no less than any of the others Moreover, it offers its own distinctive angle on these exciting events and induces children to look further and further afield, and above all to notice the relationships between the various facts it offers'

In the most recent work in this field Tulippe[12] writes on the educational value of geography Though not defining his concept of education, he speaks mainly of the development of children's intellectual aptitudes Mental aptitudes brought into play in the study of geography are observation, memory, imagination, judgement and reasoning

We treat this with some reserve A number of his phrases have an old fashioned ring 'systematic training in observation', 'develop their critical faculty', 'the mental process thus induced', 'developing their visual memory' This is thinking in terms of mental faculties Such sharp divisions are no longer used by psychologists today[13] Some understanding of this is perhaps shown in his suggestion that the final educational value of the subject is the inculcation of a geographical outlook 'As a result of all this, geography will give the pupil a concept of physical space . . a vision which will enable him to take an overall view, by grasping the relationships by which individual phenomena are linked together in the whole of which they are parts'

We have so far given the views of other writers as expressed in their works The following is our own view We are concerned with children in school, and most of the schools in this country are provided by the state It is a true, as well as convenient,

division to consider the case for teaching geography as it affects the individual and as it affects the citizen. Most theories of education allow for both these aspects. Whichever one stresses, the other plays a part. The good society will be produced by good individuals: good individuals will be produced by a good society.

The first and simplest claim to be made is that by the study of geography children learn useful, even essential, facts. These facts are mostly, in popular speech, facts of location. The apology for not knowing where a place is remains 'not being good at geography'. A child who had never heard of New York or Moscow, America or Russia, would be considered ignorant indeed. It seems a reasonable claim that children should learn a few major world locations at school, and clearly geography teachers are to blame if they do not. Once we step beyond this, however, difficulties arise. Who shall judge what locations are essential? In practice the touchstone tends to be that of current political or economic importance. It is inevitable that many corners of the world remain obscure, should such a corner gain temporary prominence through some major catastrophe, the public scans its newspaper maps or atlases without resentment that school geography did not include study of the location concerned.

One can marshal various other facts which could be justified as useful, a list both lengthy and highly debateable could be constructed. Factual information about what places are like, and the conditions likely to be encountered, are of direct practical use for the traveller, the entrepreneur and others. The work of geographers in the intelligence services of recent wars was a striking example. The need for a certain minimum core of factual knowledge cannot be denied. Unfortunately this content also cannot be defined. Geography was for long regarded merely as a compendium of factual knowledge. Not wishing to revive this attitude, we place least emphasis on this part of our argument.

A more promising claim can be made that geography teaches essential skills, mainly those concerned with maps. The most essential of these concerns the atlas, and provides a solution to the problem earlier presented. Ability to use an atlas unlocks the door to locations over the whole world. The more detailed the training, and the greater the map understanding, the more can the pupil, or adult, read for himself the basic facts of the world locational knowledge needed in everyday life. The atlas is but a particular form of the map in general. Maps of all kinds appear

in an enormous variety of publications today The case need hardly be elaborated The individual in western society frequently encounters maps in some form or other The less he understands them, the poorer is his fulfilment as a person

Map reading, and many other forms of geographical study, also provide training in how to find out about places Picture interpretation is perhaps one of the most recent geographical skills, and plays a great part here Again this helps to solve the problem of factual knowledge The cynic's attack on the geographer is to quote him as saying 'I don't know where it is but if you tell me I will explain why it is there' A more substantial response would be 'Say where it is and I will tell you what it is like'

It should be noted that no claim is made for the carry over of these skills to other fields They are concerned solely with their own content To suggest more would be to risk basing our case on the idea of the transfer of training It is tempting to claim that, at higher levels, geography trains the student in orderly methods of thought which produce benefits in the form of similar methods elsewhere Present psychological research indicates that this is only so when attention is specifically directed towards the methods involved There may be something of value here for sixth form teachers The sixth form geographer who is collating information, or weighing argument against argument, can perhaps be shown, on occasion, that there are general principles which can be applied elsewhere

We could certainly claim that geographical study enables the individual to enjoy a richer use of his leisure Geography shows us how to study places There is no proof yet that it creates a greater interest in them, though this seems a likely supposition Present prosperity offers greater leisure and greater mobility At the simplest level, children will be able to plan more interesting and rewarding journeys At the highest level, adults are enabled to enjoy a greater understanding of the countryside, or indeed of any landscape There is evidence[14] that at present children are not trained to appreciate landscape, and public examination answers reveal that summaries of salient features tend to replace awareness of real country

With great caution, we suggest that geography offers opportunity for aesthetic experience Though this is not unique to our subject, its existence should not be neglected There is a fundamental beauty in the great natural phenomena The glacier, the hurricane, the waterfall or the volcano offer something more than items for

intellectual explanation The children's experience of this may be vicarious, by means of descriptive writing There is also emotional experience in following the adventures of great explorers For older children, there is more than intellectual satisfaction to be achieved in the realisation of the subtlety of geographical relationships Much emphasis is placed in this book upon the need for thought in geography, its aesthetic or emotional possibilities should not be neglected

So far as the individual is concerned, we suggest that the main justification for geography in school is that it is a worthwhile study for its own sake It is in the timetable because teachers think it is of value Some elaboration of this value is needed The expression 'discipline of the subject', and the nature of a discipline, can be debated, and some consideration of these is given in the next chapter For the moment we therefore use the expression 'way of thought' Geography is a particular way of regarding knowledge, above all an integrating way It is the peculiar function of our subject to draw together all the facts about a place This integrating function is vital to geography It has been expressed in many ways The geographer sees things as a whole, he is a synthesiser, a collector and evaluator of relevant facts about places Some other subjects doubtless claim similar qualities, of collecting and evaluating all data relevant to their own matter In schools we believe this quality is very clearly apparent in geography

A simple and practical consequence of this quality is that, in school, geography lends itself readily to be a co-ordinator of the other subjects of the timetable There are abundant opportunities for the geography teacher to refer to them Indeed, one of his problems when constructing a syllabus is the children's knowledge of other subject matter The connection with the sciences is clear Weathering raises the question of chemical processes, precipitation of physical ones, vegetation offers links with botany, and planetary movements with mathematics The connection with the humanities is not so apparent The teacher must sometimes make a conscious effort to show the relation of geography to history, and an even greater one to persuade his pupils to write good English Certainly his specialist colleagues in these other fields will be grateful for his efforts

The division between the sciences and the humanities was deliberately mentioned As geography touches upon material from many other subject fields, it is in a position to help restore

the division between the two cultures Mackinder saw this long ago One of the greatest of all gaps lies between the natural sciences and the study of humanity It is the duty of the geographer to build one bridge over the abyss which in the opinion of many is upsetting the equilibrium of our culture Lop off either limb of geography and you maim it in its noblest part '[15]

This is a subtle matter, and we shall consider current develop ments in the subject in the next chapter In school there seem two levels of this balancing function The elementary one is that in geography children study the environment, with considerable stress on physical aspects, and they study man's activities within it, which causes them to consider man as a living, perhaps irrational, creature The advanced one arises from the fact that although geography uses, to an increasing degree, scientific method, it is not, in our opinion, wholly scientific It does not offer exact prognoses, as do the physical sciences It requires considerable literary skill We submit that a subject which considers man's activities as much as does geography has some claim to be among the humanities[16] The sixth former at least becomes aware that there are human as well as physical forces shaping our world, and that they are not reducible to a scientific formula In view of the increasing division today between the two cultures, this is surely a powerful argument for the inclusion of geography in the school curriculum

There is another aspect of geographical study not yet men tioned If not unique to the subject, it is certainly strongly manifested in it The geographer studies distributions or patterns These may be on a local or world basis How much may be inferred from their relationships is a matter for philosophical debate At school level it is enough, at the minimum, for the pupil to become aware of their existence He is introduced to another mode of thought, or way of organising knowledge He will certainly become aware also, in various ways, of the existence of the earth as a whole What benefits he may derive from this global awareness we consider later

The values we have discussed, inherent in the study of geo graphy, are sometimes expressed as its educational qualities We must be cautious in the use of this phrase Geography is some times claimed to develop various abilities, and it is easy to imply their transfer These are matters still under investigation by psychologists, and offer scope for researchers interested in geo graphy and education We claim only that geography offers

possibilities for experiences of intellectual and cultural worth It uses science and scientific method While man is a factor in the environment it must study humanity It gives ample scope for literary expression We have suggested it can have an aesthetic side, and when children encounter great world problems, it can touch upon the emotions

A reason, though not a justification, for geography being taught at present, is because it exists There is a great amount of intellectual capital invested in the subject It is popular. Judged by O level entries, it ranks among the first half dozen Children can *see* that geography exists The better it is taught, the more they become aware of its existence It is especially apt that those who study the earth can align themselves with those who climb a mountain, and say with them we do it 'because it is there' The attractiveness of the subject and the wide scope it offers, should be used to the full The case we have been presenting here is one for adults to consider, the teacher in the classroom can best justify geography by making it appeal The many aspects of geographical study offer scope to children of different abilities, and to the different abilities of children

We now turn to the relationship between geography and citizenship, of a state or of the world All modern writers make some reference to this topic The time has come to be very cautious about these citizenship claims Research quoted later indicates that they may not be as strong as previously assumed In general, it would seem that the bulk of these claims must be limited to the statement that geographical study provides important or even essential background, both of fact and of understanding for the development of the good citizen In any case, we are considering only one subject The major influence on the pupil so far as social development is concerned is likely to be the quality of his communal living, the whole ethos of the school Some subjects, among them geography and history, would claim to provide essential background information, and perhaps contribute towards the growth of a more informed understanding

Ability to understand a map is important. Much information, of civic or international affairs, is conveyed to the adult by maps, if only in the popular press These can be good or bad, accurate, impartial or downright misleading Absence of a scale can destroy vital considerations of distance Large arrows showing, say, troop movements might be less alarming if the nature of the terrain were indicated More elaborate maps with a wealth of

statistical or economic information are best mastered by those who are familiar with map reading Closely allied to this is the factual knowledge already mentioned The more the reader can clothe the simple outline map by means of his own knowledge of the country or countryside, the better can he consider for himself the points at issue

We do not claim that a detailed study of the home country increases interest in it, or even love of it There is no valid evidence to support such a claim The accent in German schools earlier this century on *Heimatskunde* would seem to lean on this idea Even apart from the calculated propaganda to be seen in atlases of the Nazi period, there was still great emphasis upon the German homeland It seems reasonable to make a detailed study of the home country Material is available It is the area in which children are most likely to travel It gives most opportunity for seeing the reality of geography. So far as citizenship is concerned we make only two points First, knowledge of the homeland is essential for an informed consideration of many current problems The population explosion in the south-east, the location of motorways, the preservation of the countryside are all current matters of which the ordinary citizen needs the geographical background Secondly, it seems to us a part of citizen ship itself that the citizen should consider and appreciate the land he inhabits, and geography plays a great part in enabling him to do this

Claims that the study of geography affects in some way the pupil's development as an international citizen have been made widely and expressed in different ways Geography is said to produce a world viewpoint, or an understanding of other peoples' point of view It is said that an understanding of foreign ways of life is likely to produce sympathy towards foreigners It is easy to see that the subject matter of geography, covering as it does other countries, other ways of life, and world distributions, suggests that it may have these wider results

Fairgrieve's famous dictum[17] may well have fostered this 'The function of geography in school is to train future citizens to imagine accurately the conditions of the great world stage, and so help them to think sanely about political and social problems in the world around' Less well known is the sentence which immediately precedes this 'We present, then, something in the nature of a confession of faith regarding what geography *may**

* Our italics

do in school' The contained assumptions, written during the aftermath of the first world war, were readily taken as fact 'To train future citizens' and 'to help them think sanely about political problems in the world' became for many accepted results rather than idealistic hopes In 1950 Scarfe[18] writing on the role geography should play in promoting international understanding, states 'The task, therefore, of a geography teacher is not merely "how can I teach geography better", but 'how can I teach my geography so that the ideas of, and the wish for, international understanding naturally and inevitably arise in the minds of children"' The teacher, then, may wish to influence the attitudes of the children he teaches Attitudes are usually expressed by the opinion of individuals, they may be formed less rationally than opinions Attitudes, fortunately, are impermanent and can be changed, the geography teachers interested in international understanding centred their researches on how to change them

Two approaches open to the teacher who wishes to foster international understanding are suggested by James and Honeybone[19] These they summarise as 'international affairs geography' and 'way of life geography' The former involves discussion of controversial problems, the teacher possibly contributing his own opinions and judgements, the latter concentrates on making the peoples of foreign countries real live people, whose pattern of existence is seen to be underlain by factors similar to those which fundamentally control our own lives They further suggest that children do not necessarily connect their geography lessons with the reality of the people and lands about which they learn, but appear to have inaccurate mental stereotypes based on sources such as comics and films For their large scale experiment they developed a series of 'way of life' lessons at the conclusion of which they found considerable improvement in the children's attitudes towards the foreign peoples studied Later testing revealed, however, that once this particular type of geography teaching was discontinued, the children tended to revert to their former attitudes

Small-scale researches followed in general, similar patterns The attitudes of children were tested before and after series of lessons designed to emphasise sympathetic understanding of other peoples whose problems of living were shown to be basically not dissimilar to our own The experiments of some workers[20] resulted in a significant change of attitude on the part of the

children concerned; those of others[21] did not. The control groups of all, taught without special emphasis on international understanding, showed no improvement in attitude. This would appear to indicate that although specific effort to improve attitudes by means of geography teaching may not always be successful, unless this effort is consciously made, attitudes are likely to remain unchanged. Other subjects of the curriculum and the whole spirit in which the activities of the school are conducted all play their part in the formation of attitudes towards other groups. It may well be, as one writer[22] suggests, that geography teaching can only take its due share as an influence, and has optimum results when the whole climate of the school is favourable to the formation of good attitudes.

Thus apart from the modest degree of modification of attitudes shown, we must base our claims for geography for world citizenship on different grounds. We can say that knowledge of other ways of life, of conditions of living, and of world interdependence is a necessary basis for international understanding, and knowledge of their geographical setting an essential preliminary to the understanding of other countries' problems. More than this, for the moment, we cannot assume.

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13. See e g Fleming, C M *Teaching* Methuen, 1958
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16 Gilbert, E W *Geography as a Humane Study* Clarendon Press, Oxford, 1955

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22 Carnie, J M, *ibid*

CHAPTER 2

THE REGIONAL APPROACH

In the previous chapter are many references to geography as a subject, although this has so far not been discussed in detail The reader may well have wished to cast forward mentally to matters considered now As we are concerned with geography in school, we have taken educational aspects first The teacher of course sees geography as a means of education, rather than education as a means of producing geographers Without some conception of the nature of the subject, however, he will be unable to see precisely its function in education

How much he needs to know is not easy to decide The specialist geographer will have already given the matter some thought The student in training will be currently considering it There are suggestions that debate about the nature of geography is overdone or unfruitful Certainly such debate is a specialist pastime The average student wrestling with Hartshorne's work on this subject may well be tempted to wonder how such dis sertation concerns him Yet not to care about the nature of a subject is a negation of learning At its extreme, it is an academic value, a philosophical problem pursued for its own sake For everyday purposes, the teacher must have some knowledge of current ideas in geographical thought, if only to have criteria for the selection of subject matter Without such knowledge, his teaching risks becoming the presentation of a collection of unrelated facts Such teaching would not fulfil the educational functions we have claimed for the study of the subject 'Geography has been defined, redefined and defined anew Geography, like history and common sense, defies exact definition And yet we are all agreed that it is the field chosen by a loose confederacy of like minded scholars who occupy themselves with the study of the earth as the home of human societies [1] We offer in this chapter our view of what constitutes this like mindedness, so far as school is concerned

Any consideration of geography in this country must include

the work of Mackinder, 'the father of British Geography' His influence cannot be ignored Cantor[2] summarises thus 'He found British geography at its lowest ebb, at a time when it was not an accepted subject at the highest levels of education, and by his insistence on sound intellectual and philosophical basis, coupled with an immense amount of proselytising work, he, more than any other single man, won for it a place in the academic sun' From his first famous lecture in 1887 to his last article[3] in *Geography* in 1943 there are numerous references to the geographical synthesis and the importance of the regional concept His statement on geography as a bridge subject has been quoted (page 9) His definition, made at the same time, should be known to students 'the subject whose function is to trace the interaction of man in society and so much of his environment as varies locally'[4] Perhaps the most vital to our argument is his statement on regional geography 'the key to the right method in school and in University'[5] Time has altered the university approach somewhat In schools we hold it still to be valid

A useful review of the whole of British geography in this century is given by Crone[6] One is tempted to follow in detail the development of the regional concept through the works of such exponents as Herbertson, Unstead, Roxby and Fawcett It can be placed in its historical context through reference to other works Debenham's[7] chapter on the history of geography offers an easy introduction, Wooldridge and East's[8] work a more advanced consideration of the subject The story as it concerns education is traced in detail by Hogan[9] and touched on by Honeybone[10] Hogan sees, as among the chief contributory factors to the ultimate formulation of the regional concept, the groundwork of Mackinder's synthesis which enabled him to isolate the unique aspects of geographical study, and the systematic studies of Herbertson Honeybone states 'Regional geography, in my view, is the very heart of geography, the central core, which more than any other feature, gives the subject its unique character'

The regional approach, although sometimes attacked and sometimes neglected, has been powerfully advocated by various modern geographers Wooldridge steadfastly maintains 'Our subject has centrifugal tendencies, and convergence from our wide periphery towards our central objective is strenuously to be sought I join with many better men of former days, among our founders and our pioneers, in claiming that this central objective

is regional geography ' He adds a useful statement on the purpose of regional geography 'It is to gather up the disparate strands of the systematic studies, the geographical aspects of other disciplines, into a coherent and focussed unity, to see nature and nurture, physique and personality, as closely related and interdependent elements in specific regions' [11]

In his inaugural lecture Pye[12] gave an exposition of object and method in geographical studies which puts this point of view We heartily commend it in full to students 'In the simplest terms the geographer's job is the study of places or lands, and we are professors of, that is we are makers of, sound learning about the earth' 'The geographer has an exciting and exacting task in seeking to find out and portray the qualities and characteristics that give distinction to place, and to understand the concrete unique complexity This it is that gives unity and coherence to our study' And above all 'Geography then, maintains the need for looking at things as a whole, and it is in his regional method that the geographer makes his unique contribution to learning'

Balchin's[13] view of regional geography supports the claim made on page 8 for certain values for geographical study 'Here we have a subject in which the approach is the reverse of specialisation, synthesis instead of analysis, an art in place of a science' It may well be that the increasingly scientific trend in geography makes for a lack of favour for regional geography The point is developed later

An even more important discussion of the idea of the region was made by Gilbert in the Herbertson Memorial Lecture in 1960, and it is not by chance that its content has relevance for our first three chapters His view both of geography and of regions will guide the young teacher in the selection of material Upon his and similar views depend the educational values we have claimed on page 9 'If imaginatively taught, university geography can provide the same kind of liberal education as that given by the Classics—a training for life Personally, I regard geography as one of the humanities Fifty years ago, Herbertson was showing British teachers of geography that the idea of the region was absolutely necessary for their work, and I claim that this is still true' There is also an echo of Wooldridge 'The binding force which can keep this centrifugal tendency in check is regional geography it must be strengthened [14]

The regional concept has its opponents Kimble's[15] somewhat

light hearted attack was based largely on the grounds that regions cannot be perceived or adequately defined, and that they have no scientific foundation One suspects his essay was an exercise in dialectic David's[16] assault is more substantial, though less original He sees that the regional concept is of 'surpassing importance to the standing of geography' In effect, he develops the oft heard theme that geography is nothing but a compendium of other disciplines 'The geographer who takes a special interest in one of the systematic studies soon finds himself outside the strict limits of his subject, and has to labour in the terrain of the botanist geologist, economist, historian or some other' Clearly the answer to this is the regional synthesis He uses shrewdly various geographers' criticisms that good regional syntheses are not being produced, and quotes an example which 'could be written by any intelligent reader of the *Western Mail*' We could perhaps infer from this that the Welsh are by nature good geographers Parker[17] in his reply, develops a further exposition of the regional concept, but warns us that geographers have raised doubts about the value of the subject by claiming that geography is a science in the same way as botany or biology Two of his sentences are of particular importance to the educator 'To achieve this final synthesis requires literary ability' and 'In a culture beset by the dangers of specialisation, it [geography] offers a unique meeting place for many branches of knowledge'

Criticism of regional work in schools can also be made, and there have been various reactions to the weaknesses exposed At times, particularly before the war, and to an extent today, school regional work became over formalised, with the result that the essential purpose of the regional approach, that of seeing the facts together, became lost 'At one time there existed the much derided 'capes and bays', at another, what we might call 'economic capes and bays', lists of products related in the flimsiest way to their environments, at another the 'pseudo scientific capes and bays', the era of the isobars and the planetary wind system, and at the present time, we seem to be over emphasising the 'regional account capes and bays' 'do not let us delude ourselves that a regional account under the headings of Position, Relief, Climate, Natural Vegetation, Occupations, etc necessarily represents a true geographical synthesis' [18]

This loss of synthesis was perhaps due to the historical development of the subject The detailed study of a country by means of regional sub divisions, exemplified above all by the French

school early in the century, was a major development in geographical method Regional geography had no real place in schools until it was introduced by the text books of Herbertson The formula of relief, structure, climate and vegetation, followed by agriculture, industry, settlement, routes and the like was widely adopted later in school and other text books A common title was 'a systematic regional geography' The inter-war period was the heyday of the 'concise geographical account It fostered and reflected this manner of approach, and was enshrined in many an examination question This formula is very deeply embedded into the thinking of many geographers, and it has its attractions for teachers It offers a plan by which the pupil can arrange the material, and few would deny the value of helping children to acquire an orderly manner of thought

One weakness of the formal account was that it could easily degenerate into the mere presentation of facts to be learnt An even greater one was that the constant repetition of the human response, following on the recital of the physical basis implied a determinist attitude It is still possible to hear children estimating that, the background being thus, man will do thus and thus Another weakness is that the constant use of the same formula gives little variety to lessons It is true that children are helped by some familiarity with style and method, but the systematic headings used repeatedly over a period of years are rather more than this justifies

To a less extent, regional work came into some disrepute through over preoccupation with regional divisions The division of a continent or the world into a given set of sub regions, bounded by lines drawn on the map, could become a major end of geography teaching, and teachers found themselves having to teach that the lines drawn in many cases did not exist In this context, Kimble's remarks have some force

There were various reactions to this over formalism during the post war period It gave some substance to the case of those who wished to develop social studies in place of geography Social studies, they claimed included much of the subject matter of geography, but avoided its formal approach The project method, at that time also to the fore, drew partly on a similar argument Projects as such are not allied to any one subject In geography, they tended to become a course of work based on a particular topic or theme In so far as they helped teachers to break away from a geography which had become rigid in

style, they were useful When they were used as the basis of a whole syllabus difficulties arose There was more than a little risk that children would no longer be studying specific places, and that geography would degenerate into isolated snippets of unrelated information The repetition of a series of projects is as unsound as the repetition of regional headings

Before developing our view of what is appropriate geography in schools today, we consider trends in the subject as a university study It is clear from the statements quoted that some advocates of the importance of regional geography have their misgivings It is even clearer that the trends in research are strongly towards specialisation and the systematic branches A glance at the titles of articles in the Transactions of the Institute of British Geographers confirms this Steel's[19] review of their publications is apposite here 'In practice it proved easier to adopt systematic rather than regional criteria, though some analysis of regional coverage is attempted later The disparate nature of the subjects suggests diversity and strength on the one hand and centrifugality and possible weakness on the other' Linton[20] anticipated this with a warning 'It matters not what your specialism is—pursue it but remember always that you are a geographer whose business it is to see things not as phenomena in isolation, but as they occur together in their regional settings

It would seem that the great bulk of geographical research is today carried out in some specialist field As knowledge expands, this development in areas of specialisation seems normal and inevitable Regional specialists still exist but their writings are increasingly forced to draw on specialist studies made within their areas This is reflected in undergraduate courses Considerable emphasis to the extent of perhaps more than half the time available in many universities is placed today on training in the systematic branches of the subject

This in itself, is not our concern and we make it plain that it would be entirely outside our field to comment upon the content and method of undergraduate courses The university departments are producing graduates not teachers In so far as many of these graduates will teach, however, we may consider possible implications for the future of the subject in schools The problem is expressed in the final report[21] of the I G U Commission on the Teaching of Geography 'One of the funda mental problems in the teaching of geography is that geographical

research is systematic, and research has not the same aims as teaching Again the specialist analyses while we attempt the more difficult synthesis in regional geography Geographers trained in a systematic way become teachers and may apply their methods in schools' It is vitally important that the young graduate should maintain an integrated view, and see his subject as a whole, at least if he teaches below sixth form level If geography in school is not taught as united geography, and in our view this means mainly regional geography, children will never see the unity of the subject about which so much is spoken If geography in schools is organised too early under the systematic branches, it would risk reverting to the disparate parts against which we are so often warned and against which Tudor David tilts

One other tendency has relevance for schools Geography has for long hovered rather uneasily between the humanities and the sciences Today it appears to be swinging towards the sciences Phrases such as 'the new scientific geography' are not unheard If this be so, apologists for the subject in schools must reconsider their ground If geography can offer only the qualities of a science as subject matter for the young mind, it will rank with the other sciences in the scramble for timetable space and, not having reached full competing status with them, is likely to be the loser

Against this background, then, we offer our conception of what should constitute geography today as a school subject Clearly geography must study places, particularly in so far as they form man's environment For children, the concrete reality is the study of particular parts of the earth They think in terms of areas, rather than ideas [22] The main layout of the school course, at least in the early and middle years, should be on an areal plan The co ordination of this knowledge into generalisations and world patterns should follow later, as maturity develops

The regional concept already expounded forms the core of our philosophy, but modifications are needed in school To make a complete regional synthesis in a literary form is advanced geography This is a possible objective for the sixth former the preparation for this in fourth and fifth is work on a regional basis, which does not necessarily call for a regional account The phrase 'regional setting' or 'regional framework' is often used today The modification of the regional concept which is particularly useful in school is the suggestion of the unifying theme Bowen argues for a unifying theme adopting the historical

approach Preston James uses population problems as a starting point for the study of Brazil

The criterion taken for the reginn will often provide the teacher with this unifying theme Reginns are of many kinds The Canadian shield is a structural reginn, California a political one, the Mississippi basin physical, the Ruhr economic, Mediterranean France climatic Work nn the Ruhr, though nn a regional basis, could rightly be dominated by economic considerations A lesson on California might well become nut of proportion unless the enormous variety within the political boundary was clearly apparent

The notion nf a problem, peculiar to nr well exemplified in the area, offers another means nf finding unity, and is in line with contemporary developments It also sets the teacher almost automatically upon a train of thought which must look for facts and then explanations Hare,[23] although considering that 'the facts of modern life have pushed regional thinking increasingly aside', supports this 'Why have we turned away from the regional synthesis—if indeed we have? I think we have done so for several reasons The first, undoubtedly, is that the regional concept is frustratingly difficult to apply in practice It has its place more in literary interpretation than in research Many of us have had to work within regional frameworks in applied geography, and in this sense the region is as alive as ever More and more we think of problems ' If the young teacher can spot the right pmblem, he is half way to giving a good lesson

Nor must we forget that geography is descriptive Cons[24] suggests that the geographical style of explanatory description involves the artistic intention to evnke the geographical scene and its realities The description and explanation of landscape is essential Thus we would agree with Pye[25] that 'Mere description of place is not enough, it must be accompanied by understanding ', yet for all children there is truth in Anderson's[26] statement that 'no deadly accurate, purely technical description can bring vividly to life a mnuntain, a great river, nr even a climate, can make it our own to love and to remember, as an imaginative description by a great writer can do' The problems involved in descriptive geography are considered in detail by Darby[27]

We have stressed synthesis and explanation Let us now revert to the place of fact The underplaying nf fact is a natural reaction

against the geography which was merely rote learning, and we would still maintain that it is the *consideration* of the facts which gives geography its chief educational qualities One sound basis of fact for children is the landscape, and it is a legitimate purpose of geography for children to learn what places are like This idea, though not developed here, will be found to recur throughout the book Closely related to this is one further principle, which will also be encountered constantly The geographer s raw material is the land, seen originally in the field He studies this in various ways As far as possible children should pursue a similar process It follows that work in class will be the consideration of various facts, presented in a variety of forms The younger the children, the more will the work be descriptive As age and ability increases, the more will explanations and generalisations about these data be sought

This leads us to the place of generalisation and systematic studies in school geography We suggest that the early years should be on a regional basis, to give children factual knowledge of countries, and to ensure that they study places that are real to them It is from this basis, in later years, that generalisations can be made It is only from known facts that children can make generalisations for themselves The forming of these generalisations can start gradually, perhaps at age thirteen or thereabouts One group of the Commission on the Teaching of Geography at the twentieth International Geographical Congress, 1964, reported[28] that 'too early an introduction of over simplified generalisations often led to erroneous ideas which were not always easily eradicated at a later date As children's knowledge of areas increases, they can build up patterns of distribution Certainly an aim for the co ordination of a five year course is some form of world revision, based on the realisation of the major world patterns

It follows that work concerning systematic geography should be similarly treated The conclusions of the systematic branches are in themselves very careful generalisations from considered data, and to offer them too early to children invites the possibility that they will learn generalisations to apply, rather than discover them for themselves At school level, this involves mainly subject matter connected with climate and landforms, though aspects of economic or historical geography may arise This is discussed more fully later, but meanwhile we suggest that in the early years of school geography teachers should concentrate on laying the necessary factual basis, for example of climatic phenomena

or landforms, using examples as they arise in the course of the regional programme

We have not entered into a full discussion of the nature of geography We have given instead some account of what we believe geography should be in secondary schools, and the next chapter gives a precise implementation of our ideas in terms of lessons This does not necessarily absolve the student from further study. There are those who feel we should press on with our teaching and stop defending ourselves, others are tired of philosophical niceties Both may be right Nevertheless, the function of a teacher, particularly at higher levels, is to stimulate young minds, and for this he must himself remain intellectually curious. Meanwhile we have nailed our flag to the regional mast, and those who would not place the main emphasis on regional geography in school must justify themselves with some other viable philosophy

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CHAPTER 3

THE GEOGRAPHY LESSON

THE opening chapters have made clear our views on the importance of regional geography in school, and our conception of its function in education This chapter is a bridge between the principles already offered, and the particular techniques of the geographer in school which will be elaborated later It is based on our conception of a major function of geography as training in the perception of relationships, and touches in general terms on methods It may perform the simpler task of offering a basis of planning a lesson It is not merely how to plan It is an exposition of certain ideas which we believe to be fundamental to geography teaching

The statements by geographers on the vital role of regional geography have already been quoted In schools with a regional layout of syllabus many if not most of the lessons will be regional ones This must not be interpreted too academically (page 21) For younger forms it should be taken in the much simpler sense of having lessons on an areal basis, that is, about some specific part of the earth's surface How the other aspects of geography, such as physical, mathematical, climatic should be treated will be considered later, both in the relevant chapters on them and in the chapter on syllabus For the moment, we are concerned with what the young teacher should consider when faced with the prospect of giving a lesson on a given area

We place without hesitation as of first importance the consideration of the aim of the lesson In the broadest sense, all lessons have the same aim, to educate the children, whatever definition of education we accept Cynics have been heard to argue that the chief aim is to get pupils through an examination, or to keep them quiet until the lesson is over A working definition for our present purpose would be that it is to further their development as individuals and citizens

An extension of this statement is that the lesson is to educate the children by means of the study of geography This rather

obvious point is repeated here as a reminder that its importance should be always in mind We are using geographical study as a means to education, and it is when this is forgotten that lessons become of little value It is not much—if anything—of an educational process for children merely to have absorbed, by ear and memory or by hand and writing, a series of facts about an area, however valuable by themselves and however logically set out It is the widespread impression of geography as a compendium of locations with no further academic merit which has so lowered it in popular esteem, and the lesson which is basically a statement of facts is laying the foundation of this attitude in the pupils The purpose of this chapter, and indeed of the whole of this book, is to elaborate the means by which geography can be used as a vehicle of intellectual development and cultural enrichment

Within these broader aims there should be for every lesson a more specific aim, which of course must be closely related to the subject matter it is proposed to cover A common aim of many teachers, if they were pressed to state it, would be one suspects, 'to teach the geography of the Paris Basin' or wherever it may be How often do we hear the remark 'We've done France Next week we ll do Germany' If the teacher is thinking in these terms the aim he has in mind is the title of an area or region This is a noun How can a noun indicate a purpose? Above all, does it not imply that the main, albeit unconscious, aim is to expound facts? We make a plea for, at the very least, some modification of this attitude

This plea is founded on the importance of the difference between exposition or inculcation and discovery A geography lesson should be, as often as possible, a process of discovery Let us consider the difference between a lecture and a lesson The lecture is an orderly exposition of a subject or a point of view The aim may be explanation, but the audience is normally told of the speaker's train of thought He presents facts, discoveries, ideas or expounds relationships He states his line of argument, and the hearers follow of their own volition and their own intellect

The lesson may also have its element of exposition There will normally be certain facts, ideas or skills which the teacher wishes the children to learn The difference is that it is the teacher's responsibility to cause them to do so It is by his art and skill that they are so persuaded, and most lessons are characterised by an active interplay between teacher and taught which is absent from the lecture Most teachers would accept that telling

is not teaching, but despite the unfortunate effect mere telling has had upon our subject, the tradition dies hard An exposition of the geography of an area, though fascinating to a geographer and digestible by very able children, is contrary to the real nature of geography, which has always been a product of exploration and is increasingly becoming an explanatory science Indeed, exposition alone is contrary to many good purposes of education At its worst, telling devolves into a routine set of notes, all to the same pattern, perhaps even copied down by the class after a brief explanation, or dictated to them

Two reservations are necessary here to avoid extremism Geography is partly a descriptive subject, and children must learn, amongst other things, to write good descriptions of places This power should be developed by practice in writing, and attention will be given later to the arrangement of written exercises which foster it Nor do we preclude children from their own written notes or other records of work What is important is how they come to make them

Today geography is permeated by a spirit of enquiry Nearly all extension of the subject by research is achieved through this The great increase in field studies, both in schools and universities, is a reflection of this spirit, and the development of applied geography in studying special problems is another manifestation of it We suggest therefore that the aims of most regional lessons, and probably of a good many others, should be so framed that the children discover, or account for, some particular feature of the area or subject of study This *reformed regionalism* ensures that they are thinking during a geography lesson, and that they are approaching the subject as would a geographer It is in harmony with both the nature of the subject and the principles of education

What the children discover, which is in general what the teacher leads them to discover, will often be some geographical relationship well exemplified in the region, or some major aspect of it The better the geographer you are, the more readily will you be able to select a major aspect of a region for a lesson Gilbert has already made this point more adequately (*op cit* p 158) 'Now geography is, in my view, the art of recognising, describing and interpreting the personality of regions Regions, like individuals, have very different characters, moreover, the characters of regions, like those of individuals, are constantly changing and developing The art of describing a region, and I do consider it to be an art, for it is futile to regard it as an exact

science with universal laws, is quite as difficult as the art of discovering the character of a human individual One cannot appreciate a human personality purely by a study of human anatomy, and the chemistry of the body, so one cannot, as some geographers so vainly imagine, appreciate geographical individuality by a study of geological and climatic conditions alone'

Some examples will illustrate this more fully 'To account for the predominance of arable land in East Anglia' 'To find out why farmers in the Corn Belt grow so much maize' 'To find out why the Clyde estuary is an important shipbuilding area' 'To discover why the population of Norway lives mainly round the coast' It is a vital part of lesson planning to arrange the subject matter to lead to the selected end Properly done this ensures that the children are thinking for themselves, rather than being the passive recipients of facts or conclusions

The above are straightforward aims given to introduce the idea Lessons must be adjusted to the age and ability of the class, and aims of different degrees of complexity are possible 'To discover why New York is a great port' would be suitable for a third year class 'To account for the dominating position of New York in the trade of the United States' would be appropriate adjustment of subject matter and difficulty of concept for sixth form discussion A simple first year aim might be 'To find out how a Danish farmer lives', but the fourth year could discover 'Why Denmark exports so much dairy produce' Another first year aim could be 'To find out what life is like in an oasis', while the fifth year equivalent would be 'To find out how man utilises the resources of the Sahara' First formers might find out 'How farmers grow fruit in North east Kent', the fifth form could 'Account for land use contrasts in South east England Again the first form could find out 'What an alpine valley is like', but the fourth year could tackle 'How man makes use of alpine valleys'

It will be seen that there are various ways of expressing the spirit of discovery in the aim, and allowance can also be made for the different attitude of age groups, as well as for their ability Younger children are more concerned with description so that 'how and 'what it is like' appear in the aim more frequently than 'why For older children 'to explain why' and 'to account for' allow for a more thoughtful approach Other useful aims which can be adapted to various levels are 'To find the geo graphical conditions which have influenced the production of ,

'To find the advantages and disadvantages of', 'To contrast', 'To find the difficulties involved in'

There should be only one main aim If there are two, the lesson will fall into separate parts rather than one related whole Thus 'To consider the industries of North-east England with special reference to steel making' casts the lesson into a double form from the start 'To account for the predominance of heavy industry' requires the same subject matter but keeps it connected Similarly 'To account for the agriculture and industry of the Paris Basin divides the matter into two sections, whereas 'To account for the main occupations in the Paris Basin' presents a unifying theme Again, 'To contrast farming in the wet and dry zones of India and to account for the existence of the dry zone' offers a direct split in the lesson, 'To account for contrasts between wet and dry zone farming in India' covers the same ground in a unified approach

It is unnecessary to have as aims such forms as 'To discover and account for the location of' tea plantations in India, or coffee fazendas in Brazil This approach encourages the habit of having double aims In fact the first part of the aim is the factual basis of the lesson One cannot consider the explanation until the location has been established Indeed, it would be unintelligent to teach about any matter without first ensuring that the class knew its location, unless, as occasionally happens, the aim of the exercise is that, given a certain number of facts, the class should be able to identify a location 'Where' is normally part of the factual content of the lesson, dealt with at its beginning It will be seen that 'where' has not occurred in the aims given The exception occurs in lessons such as 'To find where the minerals of, e g, Australia are located' This type of lesson needs handling with care Children cannot be expected to work out where minerals are by reasoning or to know by light of nature, the teacher therefore feels justification for telling A lesson is appended (page 44) to show how such telling can be reduced to a minimum

The purist might argue that the sole legitimate aim should be one which results in children discovering the personality of the region The regional synthesis needed to express this is a complex academic process and requires a maturity of mind which could only be expected from sixth formers Indeed conscious awareness of, and capacity to describe this might well be taken as one of the criteria of sixth form ability The character of the region will

nevertheless be a valuable pointer to a suitable aim for lower form lessons For workaday purposes for such classes we suggest as sufficient a phrase which requires some sequence of geographical thought. This may well be the explanation of a relationship or of a pattern of distribution

The teaching of physical geography is considered later and the need for its close integration with regional geography up to year five will be stressed The application of this principle in lessons arises here Thus a lesson 'To explain why the west coast of Wales is wetter than the east coast of England is, in effect, a first year lesson on relief rainfall 'To learn about a volcano' lacks precision 'To find out how a volcano works' is abstract, although seeking reasons 'To find why the inhabitants were evacuated from Tristan da Cunha' ensures the study of a specific place and relates the phenomena studied to human activity

It may be objected that strict adherence to the type of aim here advocated means that all the geography of the region is not covered Of course not There may well be more than one lesson on a region, these lessons will be directed towards various aspects of its geography Even if only one lesson is available, when the right aim is found, an aim closely related to a major aspect of the region, many of the orthodox items of climate, soil, relief, structure and so on will play their part in its elucidation If the matter is not relevant, it should be omitted It is surely a more scholarly process to perceive what is relevant than to insist on complete factual cover of the area

Close consideration of the lesson on Brittany (page 38) may illuminate the process of selecting aims Page 41 presents the type of material found in school text books dealing with Europe, which is often studied in the fourth year We may assume that the class will have this data For clarity of discussion we will also assume that the facts herein are all that the teacher intends to use Analysis of the text shows that it provides some detail of the history, structure, relief, vegetation, climate and occupations of Brittany It would be possible to rearrange the text into an orderly geographical account of Brittany, under these logical headings The class could copy these facts with little difficulty or thought This would result in an adult exposition of the geography of Brittany, of little interest to the non adult fourth form, particularly if their account was reiteration of a pattern already very familiar

At the beginning of the text is the statement that Brittany is

'not unlike' Cornwall and Devon We might, therefore, consider a lesson showing how Brittany resembles the South west Peninsula This means that the class should know what the South west Peninsula is like, and such a lesson might form a useful means of revising a familiar area If the British peninsula was not known to the class, its inclusion would involve detail of this new area which would be likely only to confuse what was to be learnt of Brittany, such an aim would then be unprofitable

The end of the text emphasises the uniqueness of Brittany, we might decide that this is the chief characteristic of Brittany To consider the uniqueness of Brittany in France immediately implies knowledge of the rest of France The idea of discovering this uniqueness would be valid only if the rest of France had been studied, such an aim implies revision of France and might be of use in this context

The text also reveals another geographical characteristic of Brittany, that the coast lands are different from the lands of the interior It might be possible, therefore, to consider the contrasts between these two regions as our aim Indeed, regional purists might insist that this is the only right aim We could plan the lesson then by taking two columns, one for the coastlands, one for the interior, putting side by side in each the relevant contrasts If these contrasts were taken straight from the text they would develop in a disconnected fashion not in geographical sequence We should feel compelled to present them in an orderly, consecutive manner such as would provide sound material for fourth year geographers and should therefore find that we were still summarising structure, relief, vegetation, climate and occupations, although in a way requiring more thought from the class, and stimulating more interest

Final consideration of the text reveals that there is one feature which dominates the geography of Brittany This is the sea The sea is largely responsible for the coastal features, for the presence of ports and fishing and for the climate, which in turn influences crop production This feature could be used as a link binding our geographical presentation the theme to unite the facts of Brittany's geography, the touchstone of the relevance of our selected lesson material The aim, which presents a problem the solution of which is within the capacity of the fourth form, not so complex that it confuses nor so simple that it denies interest, can be 'To discover how the sea influences Brittany

So much for aims We must next consider the actual content of

the lesson If this content is correctly chosen and planned, the lesson will have unity and coherence We have not suggested that children should not learn facts, or that lessons should not have substantial factual content The teacher's selection of facts is vital, and the criterion has already been given—their relevance to the main theme

Near the beginning of the lesson should be posed the problem which is to be solved It will have been noted that most of the aims given are couched in terms of some form of inquiry or explanation, though this is not necessarily specifically stated to the class It is often a useful opening of the lesson to put forward facts which pose or introduce this problem Thus the start of the rainfall lesson (page 31) could be with the class listing six towns, noting the total annual rainfall of each These towns would have been selected by the teacher, three on the east and three on the west of Great Britain, but would be put on the board in, say, alphabetical order The location of each, and their classification into wetter and drier places leads directly into the main matter of the lesson The lesson on Norway (page 29) could well start with consideration of a map showing the distribution of population, and the fourth year lesson on Denmark (page 29) with discussion of her export figures

Considerable skill is then needed to arrange the material or content of the lesson in the correct order, so that it is in clearly marked sections or steps These sections should be presented logically so that each step follows on or is clearly related to, the one before When, as often happens, there are several factors which are equally relevant to the solution of the problem in hand, it may seem that this order can be chosen arbitrarily According to the material available, however, the course of the lesson should fall into stages, each of which should be completed in a reasonable time, each be linked to the previous one The final stage or section draws all the threads of the lesson together and presents the conclusion

Let us continue with the lesson on Brittany as our example The facts in the order given in the passage indicate in general terms that the sea presents historical, climatic and occupational influence on Brittany *These are the main facts to be stressed*, and few would quarrel with a lesson which dealt with them as they stand *Nevertheless, such a lesson would assume that this* is the most logical order for teaching Let us consider this Certainly historical influences come first. These influences were

those of early invasion and coastal settlement These coastal settlements were encouraged by the lie of the land, so some consideration of the coastal features would occur naturally here These settlements were small centres concerned with fishing and boat building, from these developed towns with both similar and different occupations For children this is surely the next logical step, from coastal villages and fishing, to ports and the development of other occupations, such as those mentioned in the text None of these occupations is basically determined by climate, so the fact that climate has not yet been introduced will not detract from class discussion Now discussion of one group of occupations—in this case mainly industrial—leads logically to thoughts of other occupations Those to be considered are agricultural and for these a knowledge of climate is essential In this instance it seems simpler to discuss climate before agriculture, though one might study agriculture and then consider climate as a partial explanation Discussion of agriculture will naturally entail description of the land being farmed To complete our review, we need to take into account the part played by the sea in the isolation of Brittany, which is one aspect of its uniqueness It will be seen, therefore, that in place of the original three sections, we have developed six, dealing with (i) early invasion, (ii) the physical environment of coastal settlement, (iii) coastal occupations, (iv) the climate, (v) agricultural land use and (vi) the isolation of Brittany

With these sections in mind we can proceed to develop the lesson Our main concern is to provide thought-provoking work for the class We have the initial data for them, the text This is a fairly lengthy passage, crammed with facts, it will be simpler if they read it in sections first, then revise by re reading The extraction of facts from the passage will be aided by appropriate questioning, it may be helpful to memory if some facts are noted It is essential that they know the location of place names, an atlas is vital To strengthen their recollection it will be valuable if they locate essentials on a map of their own To this end an outline map of Brittany provided will present an accurate base for the insertion of detail The selection of facts to be mapped will need care, the map should show some specific facet of geography and not degenerate into a miscellaneous hotch potch of isolated facts Reading answering questions, atlas study, writing and map-drawing provide a variety of occupations which, if none is engaged in for too long a period, should hold the attention of the class

It is appropriate here to mention timing This is one of the greatest difficulties the young teacher encounters It involves the accurate assessment of the length of time any given piece of work will take the class, how long oral work will take, or the drawing of a board map or diagram If the lesson is planned in sections, it is simplest to time these, such timing is part of the lesson planning *It is scarcely helpful to* young teachers to suggest that experience will enable them to time lessons correctly, though it may be encouraging It may be more helpful to suggest that it is better to have material surplus to the lesson than to 'dry up' and be faced with a class having nothing to do Some lessons will permit a 'spare' section, a section likely to reinforce what is being learnt, but not absolutely essential to the structure of the lesson. This may be used if the teacher has overestimated the time necessary for class work Under-estimation in timing results in the need to 'finish this next lesson'. This situation is not always the fault of the teacher—abnormally lengthy notices after school prayers, choir practices, fire drill, searches for lost property and so on can all deprive the teacher of his allotted time Nevertheless the unfinished lesson should be an exception, if it is not, the lesson is incorrectly planned The lesson which begins by finishing off a topic previously dealt with is likely to lose the impact of interest The lesson breaks into two parts, the old and the new, the new is then likely to suffer from shortage of time—a vicious circle The classroom clock should face the teacher, his glances at it should be frequent if surreptitious There is no virtue in prolonging a lesson after the finishing bell, professional courtesy demands punctuality.

We have discussed work for the class and timing, the other essential in the development of the lesson is the unification of the sections selected by strong connecting links The first statement or question of each section should follow on directly from the previous one For the lesson on Brittany it can be seen that the first section ends with the sea, the second takes its effect on the coast, the third picks up the sea's influence on the lives of the people in the form of climate, and thus on land use By means of a revisory sentence we are led to discover the final effect of the sea, as an influence on Brittany's isolation Linking phrases are essential, if they do not exist the strength of the argument is weakened, it is not developed logically, and not infrequently an obvious break in the lesson results Indeed, lack of a unifying link between one section and the next often leads to loss of sight

of the aim, so that facts not essential to its purpose may be included and the end of the lesson may bear little relation to its beginning The logical conclusion is then lost, the lesson not easy to follow The class, although normally quite unaware of the fact that lessons are prepared, and so quite ignorant of technical imperfections, nevertheless react unfavourably by becoming restive and losing interest

The completed deliberations on Brittany are presented on pages 38 to 41 It will be seen that the lesson starts with the location of Brittany Questions derive mainly from the text, they are presented in logical order and are phrased to gain one correct, short answer There is some assumption of previous knowledge, namely that granite is a hard rock, that drowned valleys are called rias, with examples known from other places, and that the North Atlantic Drift has a warming influence If these facts were unknown to the class, it would be necessary to tell them, but most fourth formers would be aware of them The board summary is developed as the lesson proceeds, indicates section links, and serves as a précis of the answers worked out by the class It must be emphasised that the lesson has a conclusion This is a final summary, and directly completes the aim of the lesson by providing the solution of the problem it posed

In form, then, the lesson can be regarded as a circle The aim of the lesson is the touchstone of relevance for its factual content, the linked sections present the method of study, and the con clusion proffers the answer to the problem or plan set by the aim The lessons appended at the end of each chapter attempt to illustrate these principles The beginner may find that not all his lessons fulfil this design, but preparation of such lessons becomes easier the more often it is attempted, and a repertoire of carefully selected lessons more than repays the time spent on their original construction

The lesson form described has a clear structure, an orderly arrangement of the material planned to form a coherent unit The chapters on syllabus consider how these units should be arranged to form a connected whole We have also stressed the element of discovery This discovery can be taken in two senses the discovery of ideas, explanations or relationships, and the discovery of facts The facts needed as the basis of the lesson are provided in a variety of ways, as the examples show Many of them are discovered by the children in the course of the lesson This means that an essential element in lesson planning is the

consideration of how to present material from which the children discover the relevant facts, and how to guide their study

There are several different sources The text book and atlas are basic The picture is probably the next most important, though maps in various forms, particularly the large scale topographical map are almost equally so Statistics, diagrams, sections and other information not available in quantity can be put on the board Alternatively, such material can be duplicated and issued as needed Some information, such as the descriptive passage, can be read aloud Only as a last resort need the teacher merely tell children facts Guided investigation of such presented material ensures active participation rather than passive reception

Consideration of the form recording is to take is also necessary Oral work has little permanent impact unless reinforced by a written record, which is needed in most cases for later revision A more important reason is that writing or drawing makes a useful change in activity It is not overstressing the case to suggest that no geography lesson should be entirely oral Broadly speaking, the younger the children, the greater the variety of work that should be devised There are many possibilities other than written notes, geography *is rich in its variety* of forms of record Transects, sketches, diagrams, graphs, annotated drawings and maps are but a few The chapter on less able children includes many suggestions for record making which can readily be adapted in less simple form for more able children

The next five chapters develop this theme in greater detail Maps, pictures, text books and sample studies are seen, among others, as means of providing geographical raw material They also demonstrate some of the geographer's forms of record, though in class these should not be merely a mirror image of the form of presentation

In conclusion, let us attempt to summarise This has been called 'the question and answer method', 'the field study approach', 'the exploratory method', 'the problem method' It matters not which The geographic trilogy of observe, record and interpret is apparent We submit that the basic ideas are in accord with geographical method and the principles of education

INTRODUCTION TO THE LESSONS

We offer at appropriate places in this book specific lessons, to show how in practice we implement the ideas All have been given to the classes shown, many of them several times Broadly each group exemplifies the topic discussed in the preceding chapter, but this classification is not rigid Except where otherwise indicated, each lesson is planned to take one period of 40–45 minutes The correct replies are shown in round brackets, and instructions or comments to teachers in square ones We hope and believe these lessons are consistent with the theory we expound

LESSON I

YEAR FOUR EUROPE (FRANCE)

Aim To discover how the sea influences Brittany

Materials Required

(i) Atlases
(ii) Textbook section on Brittany (see page 41)
(iii) Duplicated (or previously traced) outline map of Brittany, indicating upland areas

Method

	Board Summary
1 Find atlas maps of France Are going to learn about western peninsula—called? (*Brittany*) Why called Brittany? Read first paragraph text book section to find out Because? (*People from Britain settled there*) Why there? (*Because nearest to Devon and Cornwall where they came from*) and because? (*Not unlike own home*) Text states Brittany is? (*A sea girt peninsula*) Surrounded by which seas? (*Atlantic Ocean and*	Influence of sea on Brittany

English Channel) Name these seas on maps provided [On board 1]

(4 *minutes*)

1 Presence of sea led to early invasion

2 Presence of sea led to invasion and settlement Are going to find out what other effects sea has on Brittany Class read second paragraph of text What does this tell about the coast? (*Rocky, island fringed, massive headlands, sheltered bays*) How has sea affected these? (*Penetrates deeply into coast*) Where? (*Into bays between headlands*) How have headlands resisted erosion? (*Are hard rock*), especially? (*Granite*) Sea has penetrated inland forming drowned valleys known as? (*Rias*) These are not mentioned in text, but you are familiar with them in? (*S W Ireland, S W Peninsula*) These inlets caused by the sea provide? (*Sites for settlement*) [Add to board]

(6 *minutes*)

2 Sea inlets encouraged coastal settlement

3 How else does sea affect coast? (*Provides living for people*) i e fish Read paragraph three What types of fish? (*Sardines, tunny, etc*) Thus most of the coastal settlements are? (*Fishing ports*) Chief? (*St Malo and Lorient*) Largest coastal settlement has developed other concerns? (*Nantes—ship building, chemicals, cotton tin plate*) Why? (*Ease of import of raw materials*) Outport is? (*St Nazaire*) Other town which is more than a fishing port? (*Brest*) Locate and name ports on map Key (i) fishing settlements (ii) industrial centres (iii) naval base [Add to board]

(8 *minutes*)

3 Flourishing fishing industry and port activities

4 Sea influences lives of people in coastal settlements and on rest of peninsula in yet another way Read fourth paragraph What mention of sea? (*Winds from Atlantic are rain laden*) i e the sea influences? (*Climate*) What other information does passage give about climate? (*Stunted briars on headlands suggest strong winds*) (*Mild winters and early springs of sea margins*) Why are winters mild on coast? (*Near to sea with warm North Atlantic Drift*) Also says inlets are sheltered—from what? (*Cold northerly

and easterly winds) by? (*Granite ridges*) Why does inland Brittany have a different climate? (*Further from sea*) Also? (*Is more highland*) Therefore? (*Colder due to altitude*) and? (*More exposed*) Passage provides key word for uplands? (*Bleak*) Why is climate 'damp'? (*Because sea winds rise from coast and heavier rain results*) All this shows that the presence of the sea influences? (*Climate*) In notebooks jot down main contrasts between climate of coastlands and interior [Add to board] — 4 (i) Climate

(8 *minutes*)

5 Differences in climate will affect? (*Land use*) Re read paragraphs two and four and jot down crops of (a) coastlands (b) interior Using atlas, on map shade in (i) coastal farming areas Key types of farming (ii) lower slopes of uplands as crop farming areas, naming crops (iii) grasslands of valleys, key as for dairy farming — (ii) Land use

(10 *minutes*)

6 Have seen effect of sea on coastal settlement and climate Is one last effect to discover Read through whole text Final paragraph says Brittany is isolated Why? (*Remote from main routes of France*) These are land routes—most people of Brittany live? (*Near sea*) We know some of land connections? (*Route to Paris*) For? (*Sending early vegetables etc to market*) Also? (*Fish*) and probably dairy produce Dairy produce is collected at market centre of? (*Rennes*) which has main line route to Paris But on whole preoccupation with the sea has influenced Bretons towards isolation [Add to board] Add Rennes to map Key as market Give map title—shows? 'Occupations in Brittany' or 'Land use in Britanny' — 5 Isolation

(5 *minutes*)

7 Conclusion In notebooks, class write down blackboard summary from memory Two children read aloud to check and summarise Class use these headings for homework essay 'How the sea influences Brittany'

(4 *minutes*)

TYPICAL TEXTBOOK INFORMATION ON BRITTANY

In the far-off days when the Vikings invaded the British Isles, many Britons fled from the peninsula of Cornwall and Devon to the coastlands opposite, a sea-girt region not unlike their home They named their new country after the land from which they came, even today this western peninsula of France is called Brittany

Few regions in France have more rugged charm Granite ridges form massive headlands to which cling stunted briars and gorse bushes, and inland present open moorlands between which lie deep, fertile valleys and secluded basins The rocky, island-fringed coasts are deeply penetrated by the sea, between the headlands lie sheltered bays and inlets where the climate is warm enough for decorative palms of subtropical appearance to flourish The sea margins are more productive than the inland valleys, the mild winters and early springs encourage the production of early vegetables and soft fruits, particularly strawberries, which command a high price in Paris and London

The sea itself has always attracted the Bretons Nearly every inlet has its fishing village The larger ports such as St Malo and Lorient handle herrings, sardines, tunny and lobster destined for the Paris market Nantes, at the lowest bridging point of the River Loire, is the biggest town in Brittany, with shipyards, chemical, cotton and tin-plate factories St Nazaire is its outport Brest is a great naval station

The interior of Brittany consists mainly of bleak uplands where the hard old rocks have weathered to form infertile soils partly clad with forest and heath, and partly used for the cultivation of crops such as oats, rye and buckwheat, which can grow in the damp climate and poor soils Grass is the chief field crop, for the westerly winds from the Atlantic are rain laden, and dairy farming flourishes in the valleys and basins Rennes is the market town of the area

The rugged character of the peninsula and its remoteness from the main routes of France have caused Brittany to be somewhat isolated Its uniqueness lies not only in its isolation, its scenery and its climate but in its history, which is in many ways linked with our own

LESSON 2

YEAR FOUR · BRITISH ISLES (CENTRAL LOWLANDS OF SCOTLAND)

AIM To find out why the Clyde Estuary is such an important shipbuilding area

MATERIALS REQUIRED
(i) Statistics of shipbuilding in the British Isles (arranged alphabetically on board)
(ii) Duplicated large map of Clydeside for each pupil (or previously traced)
(iii) Atlases, text book and notebooks
(iv) Newspaper cutting (text evident in Section 5 below)

METHOD	BOARD SUMMARY
1 Table on board shows? (*Shipbuilding, excluding warships, gross tonnage*) Gross tonnage means? [Explain] List these areas in notebooks in order of importance (*In thousand tons Clyde* 450, *Tyne* 200, *Wear* 170, *Tees* 168, *Belfast* 130, *Mersey* 68, *Barrow* 30 *Leith* 28, *Dundee* 24, *Humber* 14) These areas divide roughly in two groups—major centres producing over 100 thousand tons, and minor centres Which centres are in Scotland? Underline these (6 *minutes*)	A [Table in alphabetical order]
2 Of all areas, most important is? (*Clyde*) We are going to find out why Clyde area is such an important shipbuilding region Must locate area clearly first Using atlas and textbook map, on outline provided name the Firth of Clyde, and mark in and name the chief shipbuilding centres These are? (*Clydebank, Dumbarton, Port Glasgow and Greenock*) along banks of? (*Clyde estuary*) Check your map and put key for towns (6 *minutes*)	

3 Know now where shipbuilding area is, so look at picture in text book of shipbuilding yard on Clyde From picture, class discover (i) use of timber, (ii) use of steel, (iii) deep, sheltered estuary (iv) use of coal Other essentials for shipbuilding? (*Engines, etc*) Stress importance of (v) marine engineering and other complementary industries, and (vi) labour [Build up board summary as indicated]

(5 *minutes*)

B Advantages of Clydeside for shipbuilding

4 Will now see what advantages Clydeside has for shipbuilding Coal from? (*See text book map*) Insert coalfield on own map and name Steel from? Towns producing steel plate boilers, etc, are listed in text book Insert and name on map Deep sheltered estuary—check in atlas to see why sheltered Nowadays has to be dredged —why? (*Ships require very deep launching waters*) Shade estuary to indicate dredging and put key

Other necessity? (*Timber*) From? (*Imported—ask or name sources*) More important necessity? (*Labour*) Is good labour supply especially from? (*Glasgow*) Mark and name Glasgow on map Give map title

(10 *minutes*)

1 Coal from

2 Steel from

3 Deep sheltered estuary—requires dredging now

4 Labour from

5 Will check to see if we have omitted any advantages Have here a recent newspaper article [*read to class*] Tells us? (*20 shipbuilding firms along 20 mile stretch below Glasgow*) Which indicates? (*Is large extent of flat river bank for ship yards*) This is another advantage for Clydeside Newspaper also states? (*Clydeside engineers often first in the field with new inventions*) Why is this important? (*Maintains reputations gets world orders*) Apart from naval vessels, what are orders for? (*Transatlantic liners and cross channel steamers*) But many other varieties of ships built along Clyde Clyde used to be first shipbuilding area in world but not now Why? (*Because many competitors Japan s labour is paid less need costly new machinery*)

(5 *minutes*)

5 River bank lowland for ship yards

6 Scottish engineers world famous

6 Conclusion Child reads aloud board summary In books, class write a paragraph to explain why Clyde estuary is such an important shipbuilding area

(8 *minutes*)

LESSON 3

YEAR TWO · AUSTRALIA (MINERALS)

AIM To locate the main minerals of Australia.

MATERIALS REQUIRED.

(i) Text books
(ii) Outline map of Australia for class (traced or mapograph).
(iii) Atlases
(iv) Board map (Fig 1).

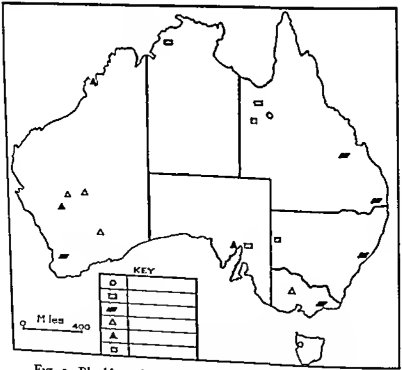

Fig 1 Blackboard map for lesson on Australia's minerals

METHOD

1. Today we are going to find out where some of Australia's most important minerals are located. Using your text books, make a list of the mining areas in each state, putting them on a chart. [Draw outline of chart on board]. Put the name of the centre and the mineral mined under the correct state name. [If the information is not available, or is out-of-date, the teacher can dictate, using the chart below upon which this lesson is based] When class have completed chart, check work by putting centres on board chart.

WESTERN AUSTRALIA	NORTHERN TERRITORY	SOUTH AUSTRALIA	QUEENSLAND
Kalgoorlie, Wiluna, Meekatharra: gold Collie coal Yampi Sound iron Wilgie Mia (near Cue) iron		Iron Knob iron	Cloncurry copper *Ipswich coal* Blair Athol coal Mt Isa: silver, lead, zinc

NEW SOUTH WALES	VICTORIA	TASMANIA
Newcastle coal Broken Hill: silver, lead, zinc	Bendigo gold *Yallourn coal (lignite)* (Gippsland)	Mt Lyell copper

2. Look now at board map and tell me the names of the states. [Add to board map.] The symbols stand for areas where different minerals are mined. How many mineral symbols are shown? (*Six.*) Silver, lead, and zinc are mined together and count as one mineral, so how many minerals are listed in your chart? (*Five*) Which is the state which has no mineral listed on the chart but has a mineral symbol on the map? (*Northern Territory*) Where else is this same mineral shown on the map? (*Queensland and South Australia*) This is a mineral discovered [since your text books were published] recently it is one very useful in modern science—guess? (*Uranium*) So add to your chart the area where uranium has been found in Northern Territories, Rum Jungle In Queensland the mine is called Mary Kathleen; in South Australia Radium Hill.

3. We now know what one symbol stands for? (*Uranium*) [Add to key on board] Have now to find out the other symbols What is the mineral other than uranium mined in South Australia? (*Iron*) So

can tell what the symbol for iron is [Add to key on board] Where else is only one mineral named? (*Tasmania*) This is? (*Mt Lyell, copper*) This tells us the symbol for copper [Add to key on board] Where else is copper mined? (*Cloncurry, Queensland*) What other minerals are mined in Queensland? (*Coal and silver, lead, zinc*) How can you tell which is which? Look at chart How many coal-mining areas are there? (*Five*) How many silver, lead, zinc areas are there? (*Two*) Which of the two remaining symbols in Queensland occurs five times on the map? Then this stands for? (*Coal*) [Add to key on board] The other symbol is? (*Silver, lead, zinc*) [Add to key on board] We are now left with only one symbol This must be for? (*Gold*) [Complete key on board]

4 In finding out what minerals the symbols stand for, we have also learnt some place names Which place names can we be sure of? (*Rum Jungle Mary Kathleen and Radium Hill*) Why? (*Because they are each in a different state*) Any other easy ones? (*Mt Lyell, Tasmania*) Why? (*Is only one there*) This also told us the location of the other copper area? (*Cloncurry Queensland*) This in turn told us? (*Silver, lead, zinc at Mt Isa Queensland*) and the other area for silver, lead, zinc? (*Broken Hill New South Wales*) We are left with iron, coal and gold These are difficult to locate—why? (*Because there are more than one or two deposits*) Yes, there are several deposits in some states Let us take iron We know one location? (*Iron Knob*) The other two are? (*Yampi Sound and Wilgie Mia, Western Australia*) What is a 'sound'? (*An inlet of water*) Which deposit then is Yampi Sound? (*The northern one*) Actually the iron is mined on islands in the Sound, but they are too small to show on the map So we now know the iron locations Can we name any of the coal areas? (*Collie in Western Australia, and Newcastle in New South Wales, and Yallourn, Victoria*) Why? (*Because they are the only ones*) Can we do the same for gold? (*Yes, Bendigo in Victoria*) You will have to use your atlases to find the locations given for Western Australia s gold and? (*Queensland's coal*) So we have worked out the locations of eleven mining areas and have five left to decide

Now put in the mining areas in your outline map Use your atlases to see that you get the locations correctly Name the mining area and put a key for the symbol showing the mineral

5 Conclusion Insert place names on board map so that class can check What does the map show? (*Where the minerals of Australia are*) Give your map a title Map to show the location of Australia's main minerals [Add to board map]

Following lesson To discover how Australia s minerals are used

CHAPTER 4

MAPS

CONSIDERATION of maps and mapwork this early in this book emphasises their importance in geographical study The statement that maps are the tools of the geographer could usefully be written into the school syllabus as a reminder to teachers Ability to use maps of a wide variety of type and scale is an essential for all who study geography, skill in this field is not particularly easy to acquire

The maps most commonly found in school geography are those of the atlas There has been considerable discussion at various times among teachers, university staff and publishers on the essentials of a good atlas for school use The results of some of these deliberations were summarised in a report published in *Geography*[1] Recommendations included the provision of an index giving the latitude and longitude of places, and the use of aesthetic colouring, with graduated shades of a single colour to show quantitative distributions All world maps should be on an equivalent projection save for that showing routes, in which case Mercator is the more appropriate A year later Jay[2] gave figures to illustrate another observation of the report, that place names were often so numerous as to detract from the efficacy of the map It is encouraging to note that some of the recommendations have been adopted by publishers, so that the most recent atlases use improved techniques for showing relief, more uniform projections, less garish colouring and, for juniors at least, fewer place names

If one considers the atlas to be the most important text book of geography, the slight attention received by the difficulties its study presents is surprising In the words of Young[3] who undertook an experimental investigation into children's comprehension of school atlas maps, the 'ability to comprehend atlas maps is in reality less than it would appear to be if judged by the casual and occasional use of the conventional atlas in the classroom' Her results revealed a change in the appreciation of the atlas with age, from the simple view of the eight-year olds, that an atlas shows

where places are and the distinction between land and sea, to the greater discrimination at 13 plus, though even at this age the scale of distance was not fully realised Although comprehension generally increases with age, a slight decline appears to set in at thirteen, whilst scale, direction and distance, even where the mechanics of manipulation have been learnt, appear to remain major difficulties All could recognise the use of layer shading to represent relief, but few could interpret it Again in 1960 Brown[4], reporting an investigation into the optimum age of pupils for introducing different types of map questions, concluded that there was need for atlases more carefully prepared to suit given ages and degrees of development Indeed, the desirability of three atlases during school life was seen, for junior, middle school and senior children

Research into children's comprehension of atlas maps is still in progress, the results may do much to further the ways in which teachers can promote this comprehension Understanding of the limitations of atlas maps is fostered by constant use of the globe Brown's research, like that of Young's, supports this view, and similarly indicates that whereas children of early years can handle scale and direction easily as a mechanical exercise, real comprehension and interpretation comes later only with direct training Children should use atlas map scales frequently, and use index references for the latitude and longitude of places 'Capes and bays' rote learning fell into disrepute because it was unintelligent, unselective and unreal, but no geographer would suggest that it is unnecessary to know where places are Indeed, five or ten short questions on locations, distances and directions, the answers to which may be found in the atlas, are occasionally profitable as an introduction to a new area

The content and style of most wall maps is very similar to that of atlas maps Ability to read and interpret both can be assumed to develop together Now that all secondary children have access to an atlas each, wall maps are less necessary Children enjoy finding information and locations from their own atlas map The main use of the wall map is to assist them in finding locations, and this in itself is evading an essential exercise One could say that the very presence of the wall map before the children helps them to build up a visual image of the shape concerned Its presence also offers the teacher a temptation to lecture which should be resisted

It seems reasonable to suppose that understanding of the

small scale maps of atlases would be easier to children with experience in using large scale maps The more progressive primary school geography involves exploration of the 50" and 25" O S sheet of the home district, followed by carefully planned stages of progression to maps of the home country This approach is often revised in the first year of secondary school, where 25", 6", 2½" and 1" maps are put side by side in the geography room to demonstrate the more clearly the decrease of detail and of scale A logical step would appear to be a continuation of the progression with atlas maps of ever decreasing scale Children are seldom aware of connection between large scale Ordnance Survey maps and atlas maps, they should be familiar with the ways in which both present information, with the similarities between them, and with their limitations

Work in the first year of a secondary school course commonly introduces the 1" O S map There is an introduction to symbols sometimes merely listed and learnt, and to contour lines and simple section drawing The stimulus of public examinations with a compulsory question on O S map study ensures that some part of the fifth year is also devoted to this work All too commonly, however, the intervening years pass with little reference to large scale maps unless their use arises in the field The weak answers of many O level candidates show only too clearly the results of insufficient training in the interpretation of such maps An analysis of errors made by O level candidates will show some of the difficulties found by sixteen year olds in such interpretation, these may in turn illuminate the teaching problems that arise

Confusion between east and west is surprisingly common, north is always assumed to be at the top of the page, and a compass point indicating north elsewhere is often ignored or causes confusion Candidates find difficulty in giving and interpreting grid references There is uncertainty as to the meaning of map symbols, there being especial confusion between embankments and cuttings, the relation of these features to the topography being apparently unrealised Weirs are not generally known, and in one year some seventy five per cent of the candidates selected a ford as a means by which man controls the waters of a river Vegetation other than woods is often ignored and even woods are interpreted as consisting entirely of one species of tree Orchards are not recognised Little is known of the meaning of site, and very few can generalise about features The wider picture is too often lost in a detailed enumeration of buildings

such as churches and schools, means of communication, and other specific and separate items shown by symbols Candidates are sometimes unable to measure accurately a given distance or to translate such a measurement into real distance The shape and location of extracted contours are often grossly inaccurate in lieu of being approximate Candidates find difficulty in describing relief, it is apparent that they can recognise the contour groupings of a col, saddle or spur in isolation, but they are unable to knit such topographical features into a coherent description of relief. Hills of 500′–800′ are commonly called mountains, rolling topography between 200′–350′ is described as flat Drainage is seldom seen as the pattern of surface water Rivers are not infrequently referred to as running inland from the sea, in maps they are often drawn as running uphill, or are left without outlets though the coast is shown Drainage ditches are inevitably called irrigation ditches, whilst lack of surface water is not seen as a significant feature of the landscape

Analysis of these summarised errors indicates many weaknesses, these include the skills involved in map reading These are first, some appreciation of direction, second, an ability to translate symbols, and third, an understanding of scale, both horizontal and vertical We must now consider how teaching can best impart these skills

The teaching of compass points is a relatively simple matter, and most first formers are genuinely delighted at their prowess in boxing the compass A simple device for the unreliable of memory concerning the relative positions of east and west is reference to the word 'we' Geographical teaching should always be in terms of compass points—left to right, up and down, top and bottom in connection with maps should be avoided However, ability to assess direction on the map should be reinforced by familiarity with direction on the ground Children should be aware of compass points in relation to their school and home environment Contact with reality can be stimulated in lessons by the occasional query—in which direction from here, in this room, would we have to travel in order to reach such and such a country or town? In the field, too, children should be taught to orient themselves, using the sun when possible, or some significant features of the landscape The reading of grid references is simplified if they are thought of as being lines of longitude and latitude The army phrase for eastings first, then northings, is 'along the corridor then up the stairs', but this may be refuted

by purists as implying that northwards is 'up' It seems certain that confusion arises in the minds of those examination candidates who have had insufficient long-term practice at using grid references If giving and interpreting such references is considered simple for a first year form,[5] then repeated practice at intervals during the rest of school life should ensure that the exercise becomes even more simple for fifth formers

The translation of symbols is worthy of careful attention It does not seem that the mere making of a list in the first form is adequate Copying the 1" O S map key and finding one or two examples of each symbol on the map is surely ungeographical —almost unintelligent—since one of the aims of map reading is to help children to visualise what the area of land represented by the map is like A lesson suggesting how the meaning of symbols can be learnt by means of study of the geography of the area mapped is appended The actual symbol may itself represent a feature with which the children are unfamiliar, e g the ford— such a symbol needs supplementing by a picture, but this situation is not common The mere listing of symbols means that even familiar features such as roads, railways, churches and buildings are seen only in isolation, and children gain no practice in visualising what might be called the blank areas of the map This preoccupation with symbols in isolation may explain why children reading maps do not readily see human features in relation to the physical features of the landscape, it may also explain why they so often fail to notice what is missing from an area, e g surface drainage in limestone country It would certainly explain why fifth formers can recognise isolated topographical features without the ability to see the area as a whole To this end it is of great value to use pictures of the areas mapped whenever available, and many exercises which integrate map and picture can be devised Besides straightforward matching of the two, such questions as 'What can we discover from the picture which we cannot from the map?' (or vice versa) are useful Pictures are, of course, but a substitute for the reality of the land, and it is not possible to overemphasise the importance of field work in connection with map study The more practice children gain in describing what they see on the land, the more likely it is that they will come to visualise the area which the map represents, rather than the map itself

The third skill we noted involved the understanding of scale, and horizontal scale is in some ways easy to teach It is a frequent

first lesson in year one of the secondary school to ask children to draw a map to show where they sit in the form room This they draw on the given piece of paper without considering any problem of scale, although they may include the wall blackboard as if it were a hearthrug and unhappily try to suspend electric lights This exercise can be extended to 'How I get to the school gates', which enforces the showing of a larger area on the same size of paper The area may then be extended The natural continuation is, as already suggested, some study of the 25" or even the 50" map of the locality as the nearest approach to reality The subsequent use of 6", 2½" and 1" maps of the same area shows clearly the difference in scale and some of the problems involved There is nowadays less use of this approach since it may have been introduced in primary school, or because it has become stereotyped and is sometimes taught with no clear idea of its purpose None the less, it provides a satisfactory introduction to the problems of scale It has been found to work, and need not be discarded as old fashioned, any more than it should be conserved without reason other than tradition A variation used successfully is the omission of the first stage by providing the actual measurements of the geography room so that children can draw the map direct to scale

The other case of scale to be considered is that of vertical scale, understanding of which means an appreciation of relief A number of adults, who had recently completed university degrees, but had not studied geography beyond O level, were asked what they understood by the term relief A few representative answers are given 'Relief is the colouring of a map showing upland and lowland position' 'Relief is a map showing the contours of a piece of land in three dimensions' 'Relief is a method used to depict the dimension of height and depth' 'Relief is the term used in geography in connection with maps or models, and implies a knowledge of the height or depth of the terrain above or below sea level' 'Relief is a way of showing the structure of the earth, based on a scale rising from sea level'

These definitions, and others not listed, are not concerned with the reality of relief, but with the method of showing it It is evident that the teaching these adults had received did not lack emphasis on contours, colouring and contour maps Indeed, since the most accurate representation of relief on maps is that shown by contours, it is proper that contours should receive attention and emphasis Clearly it is also necessary to focus

attention on the land itself, so that the relief features are imagined accurately as parts of the earth, not merely as pieces of paper lined with contours

The emphasis on contours should be as a form of isopleth, or line plotting the distribution of a given phenomenon There are several definitions of contours, but one of the most simple is 'contours are lines drawn on a map through all points which are at the same height above, or depth below, sea level' This definition makes clear that contours are map lines, not land lines, and includes submarine contours which children may have already noticed in atlas maps A first contour lesson may well start with depth, since children can readily work out in simple terms how depth can be measured, whereas how land heights are measured is too complex Such a lesson is appended It has the advantage of working with a real location and involves a real problem, one which has proved of interest to boys and girls at the age of eleven years The transition to land contours follows quite naturally

Schools built in monotonously flat areas are clearly at some disadvantage for contour work, but in this country they certainly form a minority Alignment of the children themselves along a contour, even on the most moderate slope, is an introduction which convincingly demonstrates the function of a contour as separating areas of different height This 'human contour' shows also that, like other isopleths, contours are not lines visible on the ground, and that the shape of the contour depends on the configuration of the land—that is, that contours show shape It is possible to align a class of children along several contours, the interval chosen being related to the terrain, and then question them as to heights in between the contours, as well as requiring them to record on paper the shape of the lines they themselves represent This record of contours made by the children themselves, numbered in feet above sea level, is next linked to the contours shown on the large scale map of the school area These the teacher can draw on the board, omitting other features save a few for locating purposes such as the school, a church or a station The recorded contours can then be inserted in the appropriate place, so that the children realise that they themselves have 'seen' only part of a system of such lines which represent the height and shape of the land on the map (Fig 2)

There is little doubt that many children, introduced to contours in the classroom in the shape of a single conical hill rising from

nought feet, are bewildered by later study of maps which show no such convenient features Even if the first contour lessons are extended to include recognition of contour groupings of cols, saddles, spurs and valleys these are frequently given as appendages of the original simple conical hill, or are studied from black and white sketches in map exercise books as isolated features, not followed by the exercise of searching for similar contour groupings in the coloured confusion of the O S map The study

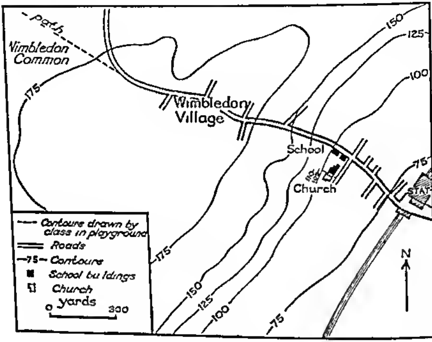

Fig 2 Blackboard map for interpolation of 'human' contours

of contours in relation to an area of known ground is an introduction offering a more intelligible basis on which to continue building contour work of increasing difficulty

In contour work the first step may thus be an introduction by means of contours showing depth, the second is the recording of a few contours in the immediate school locality The third step in the progression of work may well be the study of hill contours, but these should properly be of the hill or slope on which the school lies, or of one familiar to the children The selection of a hill known to them gives reality to the work, even though its contours may need simplification for introductory purposes In

built-up areas particularly children do not easily see that walking uphill or downhill has any connection with the hills and valleys of geography, indeed, all too often it has none, if local terrain is neglected If the children have actually seen what the shape of the land is, the shape of contours is more readily understood By continuing the idea of the 'human contour' the children become aware that a completed contour round a hill is circular, that the circumference of the circle decreases nearer to the top, and that on paper these contours show, in their simplest form, as concentric circles with a dot for the highest point, if known. A duplicated contour map of the hill should then be provided, and exercises devised ensuring that the children are aware of heights between contours as well as of those along the contours themselves This contour map might well be layer-coloured, a suitable key being added Further work could take the form of a second hill known to the class, to which contour heights must be added, the interval being known

Section drawing at this point is a helpful fourth step It is logical to select a hill the contours of which are already familiar to the children It is essential that the section drawing has a purpose To this end it is particularly useful if a road runs over the local hill, since the section can be taken along the route of the road It increases reality to assume that the first section line is a road in any case, since children readily appreciate that the steepness of roads, or the fact that they run downhill or up, is of interest to pedestrians and cyclists like themselves (Fig 3) Although at first sight it may appear simplest to teach children to drop perpendiculars from the section line across the contours directly to a section baseline given underneath the map, in reality when sections are later drawn from other maps this method is not practical It is therefore more economical of time to teach from the start section drawing using a strip of paper placed along the section line, the points where the contours meet the edge of the paper being marked in and numbered This strip is then placed along the baseline of the section, the recorded heights being transferred to the appropriate places in the vertical scale as a series of dots The section is completed in the normal fashion by joining the dots

Having learnt how to recognise the contours of a hill, and how to draw a simple section, it is necessary for the children to progress to the recognition of other contour shapes, and, later, to the drawing of more complex sections The recognition of contour

groupings in isolation has little to commend it, for it is evident that such recognition is not necessarily applied to the complexities of maps of real areas (see page 49) The next practical step is to the O S map itself, but this is one too great to be taken in a single movement by the majority of children It is therefore useful to provide a fifth or intermediary stage, in which the child is presented with a duplicated copy of the contours only of an area of relatively simple topography taken from an O S map, copies of which are available for class use A similar map should

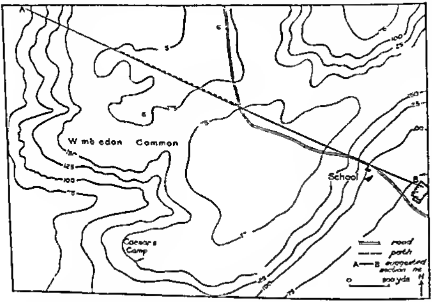

Fig 3 Contour map for first section drawing of a hill

be drawn on the board The class can first work out the contour interval and then number the unnumbered contours They can identify and mark the contour groupings of any hill shown, and indicate whether slopes are steep or gentle Any significant areas of relatively flat land can be shaded Next, rivers or streams can be added to the board map, the shape of the contours in the valleys is then a natural query, and needs explanation No reference should be made to spurs at this point It is inadvisable to draw the attention of children to the fact that spurs and valleys can be confused since this invites confusion The children then add drainage to their own maps Distribution of the printed map to the class then follows, so that the children can compare the two Pictures of the land should be shown whenever available,

so that the blank map areas are seen to be grassland, moorland or arable There can be added to the base map any simple features related to relief—a railway following the river valley, a second-class road across the highland—these being added also to the key In this way the children are not only learning to interpret symbols, but are seeing human features in relation to the land Other maps showing features such as spot heights, triangulation stations, cols, spurs and escarpments should then be introduced, using still the base map of the contours Such maps may need simplification if the areas chosen are high and the reproduction of contours very complicated Such a contour base map may be layer coloured Emphasis should be given to the fact that contours and layer colouring also appear in atlases, so that the children realise that all these are *similar attempts to show* on a map the height and shape of the land

Clearly the interpretation of large-scale maps should be approached with care, and will need considerable study Maps are meaningful to children if they are related to their experience, and thus they are best introduced when a need for them is felt, as in a study of local geography or other field work The elements of map interpretation may well be learned by experience, for features such as valleys, scarp slopes, spurs, cliffs, bays and others may be known through field work Much of the work on maps is developed, however, when areas beyond the children's experience are studied This work will therefore need to be graded for application during all years of school life Thus in year two study of a map of East Anglia might precede study of the Pampas, that of the flood plain of a British river might precede study of the Nile valley, whilst detail of the African Rift Valley might well be related to a map showing a British fault In year three work might be based on the topographical map of a prairie farm, or an area in the Middle West, whilst study of the River Trent from large-scale maps could precede that of the Mississippi River The Tees basin has been used to introduce detailed study of a river, High Force and its gorge being comparable in origin to Niagara Work on the Steppes by means of a relevant topographical sheet is shown on page 118 In year four it is possible to link study of the fiords of Norway with that of the west coast of Scotland, of glaciation in Switzerland with that in the Lake District or Snowdonia, and of the ria coasts of Brittany and Spain with those of the South west Peninsula The karst areas of the Pennines have similarities with those of the Causses, whilst some

features of Breckland can be linked with those of the North German Plain By the fifth year the children should be reasonably adept at map interpretation, and ready to make full use of O S maps as introductory or revision data for regional study, for which these maps are particularly valuable

Our concern in general so far has been with children's recognition of the features shown on maps by means of contours and symbols This is equivalent to the similar first step in the field, that of observation In map work too the next stages are concerned with recording and interpretation A basic method is the pupil's own map, which at first should record selected features, such as the land above a certain height, the drainage, or the pattern of major communications To this can be later added significant distributions, such as that of vegetation or settlement The beginnings of map interpretation can be made with the fourth or fifth form exercise of a map to show the main physical divisions

The aspect of recording which seems to be neglected in schools is that of written description Johns[6] suggests that 'the description of landscape can ultimately take its place with the historian's description of events in time as a genuinely great contribution to human understanding The subject of geographic art is landscape One suspects that most geographers embark on their life's work excited in the first instance by the visual impact of scenery ' How little of this excitement shows in any child's descriptive writing culled from study of large scale maps! The art of descriptive writing, fostered in English lessons, seems seldom encouraged in school geography Bold descriptive writing comes with confidence, confidence is engendered by accurate mental images of the land seen in place of the map representation Children should be trained to write in terms of reality, they need to build up a wide descriptive vocabulary used to present the total pattern of landscape 'A flat coastal plain hemmed in by a solid range of low mountains forming a crescent shaped curve rising to heights of over two thousand feet' is surely not beyond the pen of a fifth former, who writes instead 'There is a coastal plain There are mountains behind which form a curve These are sometimes over two thousand feet high' The series *British Landscapes through Maps*, published by the Geographical Association, provides excellent examples of descriptive geographical writing with which most teachers are familiar

The provision of sufficient large scale maps for school use has always presented a problem, but nowadays few schools are

seriously hampered through their lack Apart from the map sheets themselves, there are many mapping books on the market which contain selected map extracts, often with accompanying pictures and exercises One of the best sources of such extracts is the public examination itself Teachers often collect the map sheets presented in the examination, and further copies are available at a modest price from the Ordnance Survey, Chessington Modern text books also include map extracts In many ways map extracts are more convenient to handle and learn from than the more unwieldy full sheets A normal collection would include such items as a glaciated highland area, a chalk downland clay vale area, a millstone grit carboniferous limestone area, a lowland agricultural area such as East Anglia, a varied coastal area such as Swanage, an area of ria coast, one of fiord coast, a coal mining area and possibly special items like the Fens or the Broads

The exercises to be derived from such maps are legion They should be devised to include the use of scale, the recognition of symbols and the interpretation of relief The class can take an imaginary walk across an area, describing what they will see and using photographs to check, the line of the walk often forms a suitable line of section A few squares only of the map can be studied in detail for characteristics which make them typical of a larger area, the larger area then being delimited on a sketch map Often one such area can be contrasted with another, the differences in underlying rock often offering the final explanation of the contrasts The distribution of marsh, woodland or moorland can be examined, the distribution being both mapped and described in writing Good practice in giving grid references is established by locating examples of various features, if these are physical they should then be woven into the general pattern of relief in a written description The surface drainage of an area can be mapped and described Springs can be mapped to suggest spring lines Maps can be interpreted in the light of how man makes use of the land, how he controls water how relief influences land use and the pattern of communications Some maps offer features of historic interest which throw light on geographical study Maps can form the basis of lessons on shorelines or glaciation, providing real examples which might otherwise be learnt less satisfactorily from idealised drawings unconnected with specific locations, such as are all too commonly found in school texts of physical geography The use of pictures in conjunction with

maps provides a further series of useful exercises, generally emphasising the picture as the reality of the land and assisting identification of land features represented on the map

The use of large-scale maps in school need not be confined to those of this country Mention has already been made of topographical maps of the Prairies, the Middle West and the Steppes of the U S S R A modest collection of representative sheets of the official surveys of foreign countries, particularly for sixth form use, should be built up as funds permit, once the basic supply of maps of the homeland has been established There are also many less formal large scale maps, e g motoring maps, which are of value A map showing roads in the Appalachians emphasises the south west—north east trend of the mountains and the difficulty of east west routes with surprising clarity The rectangular road pattern of the Middle West is most illuminating to children familiar only with our own rambling roads This type of map is available from large oil companies, and is often free The density of the nucleated villages clustered on the Lombardy plain, the network of dykes in the orderly rectangles of the Dutch polders the escarpment edge and volcanic craters of the Great Rift Valley of East Africa, the ribbon of cultivation which is the Nile valley all become real phenomena when seen on such maps The study of town sites such as that of Hamburg is more readily comprehended with the aid of large scale maps, showing in this case detail of marshland and clearly significant contours Children react with freshened curiosity when foreign maps are offered for study An extra key in English adds interest to foreign words, many of which may indeed be known to the class The teacher may feel handicapped by the possession of only one copy, to be used as a wall map for class demonstration Sometimes it is profitable, if the map is of an area with different types of country lying east to west across it, to cut the map into north to south strips, each strip containing representative characteristics of the whole sheet After individual study of the strips they can be pinned in place on the wall to reconstruct the whole area (Fig 4) Foreign map extracts prepared for overseas public examinations are helping to increase this supply

It is true that a large part of the geographer s skill lies in his ability to interpret maps, but for the average child the most likely use to which he will put maps is as a means of finding his way about It is probable that this use will be emphasised in r exercises devised to this end in class work

His ability to read a map for this purpose will be increased if he can see through the map to the land it represents, this means that he will also appreciate the limitations of maps, and will be aware of what they do not and cannot show It is this negative aspect of maps which will be of particular value when applied to the study of atlas maps, which by reason of scale are of limited effectiveness It should not be assumed that children see any

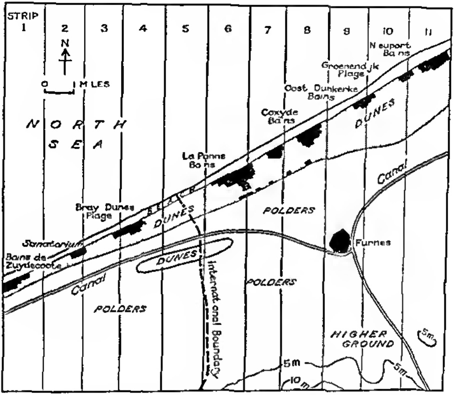

Fig 4 Large scale map showing strips for class use

relationship between large scale maps and atlas maps, for they do not, such links should be made deliberately whenever opportunity offers, so that the study of large scale maps effectively assists appreciation of the scale and limitations of the atlas

Children's Own Maps

So far we have mainly considered maps as documents to be read and understood They are also one of the most important means of children recording and expressing their knowledge The teacher must therefore also plan for a steady development

of the skill of map drawing It is impossible to give a narrow codification of techniques Mapping skills should develop as part of general geographical education, and some forms of progression have already been implied We consider now, however, some specific topics

Much elementary map recording is made on provided outlines Outline maps can be bought, or duplicated in quantity The duplicating waxes can be filed for future use Spirit duplicators allow use of colours which are attractive, and are easy to use, though they give somewhat limited numbers of copies from one master sheet A quick form of duplicating is the mapograph, and a wide range of outlines is available Outlines of a simple nature can be drawn by the children themselves, but for accuracy tracing is more efficient There is no doubt that the insertion of information on provided outlines is a useful and important method of recording and learning It is also clear that their continual provision will undermine development of skill in freehand sketching Such development may well assist children to realise more exactly spatial relationships Both systems have their place, but we suggest that in the long run the artificial prop should be discarded, and the ability to draw the freehand sketch be the goal

Sketch maps are commonly held to be the geographer's shorthand The purpose of including their drawing as part of geographical training is to ensure that the student is competent in this particular shorthand to ensure that he has this peculiarly geographic skill If the training is sound, the sketch maps drawn should be good What are the criteria of a good sketch map? It should illustrate one point, the point illustrated being made more clear by mapping than by writing It should be able to be drawn easily, to this end being simple, not overcrowded, and not containing irrelevant information It should be attractive to look at, without garish colouring have a simple orthodox key, an indication of scale and orientation, and a title The title, like the map itself, should make clear the purpose of the drawing Thus a sketch map to show why Brighton is a popular holiday resort would need a recognisable stretch of coast, with the location of the town itself sufficiently large to allow some indication of shops, amusement centres and hotels It would need an indication of the nearness of London, by time or distance, of the presence of the sea for bathing, boating and fishing, and of pleasant downland scenery in the vicinity

The selection of appropriate facts for sketch maps needs practice In year one few such sketch maps are drawn, the majority of mapping being concerned with the addition of simple information to provided outlines Progression to sketch maps can come in year two, with simple maps to show the coffee producing region of Brazil, the position of Rio de Janeiro, the extent of the Pampas, or the division of Chile into three natural regions For all these maps the children should be questioned to provide the data essential for illustrating the point as the map is constructed on the board, thus all maps will be seen to include only essential information In year three, when children draw their own maps with less guidance, these principles still hold good Having learnt how to draw a map to show the situation of Winnipeg and New York, the children might be encouraged to attempt their own map of Vancouver or San Francisco By year four they should be able to select for themselves the facts necessary for a given map

Such progressive training may help to remove a common examination weakness An invitation in the rubric to 'draw sketch maps whenever they serve to illustrate an answer' leads candidates to reproduce maps learnt by heart which are not always strictly appropriate The majority of fifth formers whether asked to draw a map to show the importance of Liverpool, or the site of Manchester, or the location of the Cheshire salt fields, or the South Lancashire coalfield, offer the same map one which really indicates the location of industrial centres in Lancashire Only the most able provide an original map specifically in answer to the question To select factual detail relevant to the illustration of a given point is not a simple task even for able children For the less able there is difficulty in reproducing from memory a given map We suggest nevertheless that training in sketching maps should include the consideration of relevance

We advocate a minimum of direct copying from the board Board maps are not always accurate, copying by children inevitably involves multiplication of error The children should use their atlases to ensure correct scale and location The in formation on the board map could well be incomplete so that children have to think while copying For example, only the initial letters of features need be indicated on the board the class being required to insert the correct names in full on their own maps The direct copying of text book maps is also to be avoided (pages 96 and 162) The style of printed maps is not always that best suited to those drawn by children It seems likely that

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direct copying of maps is partially responsible for much thought less reproduction

Style in mapping needs care Highland should be shown by an area of shading limited by a contour, rather than by a single line, however thick, and height should be indicated For speed children should be encouraged to shade by diagonal lines, drawn freehand, rather than by the complete shading over of the area Routes should always be labelled, and the essentials of the relief which directs them be indicated where possible Printing should normally lie across the map as is normal in writing, this makes for ease of reading The value of a frame for the map is debateable Drawing a frame is time-consuming, and may lead to the cramming of lettering into inadequate spaces, though it may help a habit of neatness It should always be possible to begin the title with 'A map to show ' If this proves difficult, it is likely that the map has no clear purpose

No discussion of map work would be complete without some emphasis on the close link between maps and geography Map work should be an integral part of the geography learnt in the lesson It is not possible to over emphasise the part that can and should be played by the large scale Ordnance Survey map in the regional geography lesson To study this map in isolation is to neglect its value as data for regional study The information it summarises is that basic to the region, it should be used to enliven the study of regions The topographical map often presents the introductory material for a lesson, whereas the sketch map frequently summarises it To achieve optimum benefit from map work it must be integrated in the syllabus The provision of a graded course in both interpretation and sketching is essential for good geography teaching

NOTES

1 Report. The ideal atlas for pupils aged 11–16 years' *Geography*, Vol XXXVIII January 1953 pp 33–35

2 Jay L. J Significant place names in school geography' *Geography* Vol XXXIX January 1954 pp 28–32

3 Young I V 'An experimental investigation into children's comprehension of school atlas maps' M A London, 1952

4 Brown, T W 'Map work and the use of maps in school' *Geography*, Vol XLV, November 1960 pp 305–307

5 *Ibid* p 306

6 Johns Ewart Langstone Rock An experiment in the art of landscape description' *Geography* Vol XLV July 1960 pp 176–183

LESSON 4

YEAR ONE MAP WORK (CONTOURS)

Aim To introduce contours

Materials Required Atlas and duplicated map of Southampton Water for each child (Fig 5)

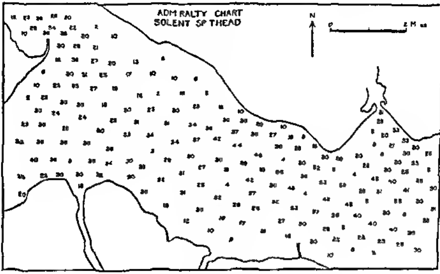


Fig 5 Admiralty chart Solent Spithead

Method

1 The duplicated map shows Solent and Spithead waters Where are these channels? (*Between Isle of Wight and Southampton*) On your atlas map locate the Isle of Wight, Spithead, Solent, Southampton and Portsmouth Can now place our area exactly

2 What are all the numbers on our map? (*Depth in feet*) Why is it useful to know these? (*Because they tell us where the water is deep enough for ships*) Which are the biggest ships to use Southampton Water? (*Queen Elizabeth and Queen Mary*)

3 We can tell how much water ships need by lines painted on them thus [Draw sketch on board (Fig 6)] The *Queen Elizabeth* needs

37 feet To allow a margin of safety we'll say? (40 *feet*) But if you read the line of figures showing depths nearest to Southampton the deepest part of the water is only? (36 *feet*) How is the *Queen Elizabeth* still able to sail into Southampton Docks? (*Uses high tide*) The *minimum* tide is 10 feet All the depths shown on your map are those at low tide, so what depth on our map will be satisfactory for the *Queen Elizabeth*? (30 *feet*)

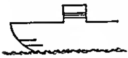


Fig 6 Sketch to show draught of a ship

4 Knowing that the *Queen Elizabeth* will be safe in 30 feet of water as shown on our map, we can now find out where she must sail in order to dock safely at Southampton Taking the area of water nearest to the Isle of Wight, underline lightly in pencil all the depths of less than 30 feet

[Draw outline on board while class busy, or previously Insert figures of line *a* (Fig 7)]

Now draw in a line linking all depths of 30 feet, so that all the shallow numbers underlined lie to the *south* [Draw in line *a* on board]

Now underline numbers under 30 feet along short length of coast to the west, then draw in the line linking all depths at 30 feet [On board line *b*] Repeat for line *c* and *d* [Do on board to help class] Class can now complete the line following the north coast, linking *c* and *d*

5 We now have several lines on our map which all show the same thing This is? (*That the water along the lines is* 30 *feet deep*) The water

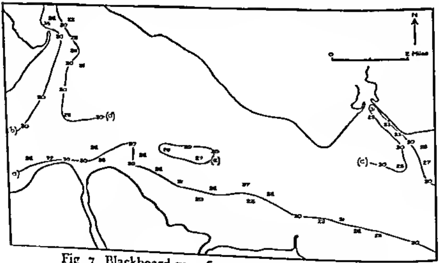


Fig 7 Blackboard map for use with Admiralty chart

near the shore is? (*less than* 30 *feet deep*), and as far as we know at the moment in the centre of the channel the water is? (*More than* 30 *feet deep*) Look at the centre depths and see if all the water is more than 30 feet deep Is it? (*No, there are two depths of* 27 *and* 28 *feet respectively, and two of* 30 *feet*) [Add these figures to board (*e*)] Here the water is shallower than 30 feet, so we can mark off this shallower water by putting in another 30 foot line on your map [Add 30 foot line (*e*) to board] What do you think probably makes the sea shallower here? (*A sandbank*) Why will the *Queen Elizabeth* have to avoid this area? (*Sea too shallow, would get stuck*) How do you think the presence of the sandbank is shown on the sea's surface to warn ships? (*Use buoys*) Put four crosses on this line to indicate these buoys, and put a key for them on your map

6 The lines we have drawn on our map now all show? (*That water along them is* 30 *feet deep*) They also show? (*The shape of the channel*) Lines which join together places of equal height are called *contours* [Write on board] These lines which show equal depth below the sea are called? (*Submarine contours*) Contour lines are lines on maps which show equal heights they also show? (*Shape*) What other lines could we show on this map? (10 *feet*, 20 *feet*) Up to? (50 *feet*) We won t add these as at present it is easy to see where it is safe for the *Queen Elizabeth* to sail Shade in lightly on your map the safe seas Which are these? (*Over* 30 *feet deep*) Add a key for the shading Also add a key to indicate the 30 foot contour line

7 Now add a title to your map A map to show where the *Queen Elizabeth* can sail in order to reach Southampton Docks '

LESSON 5

YEAR ONE MAP WORK (THE PENNINES)

AIM To discover Ordnance Survey symbols on 1 inch = 1 mile map

MATERIALS REQUIRED

(i) Individual copies of part of Sheet 96 1" O S map (available in text book)
(ii) Wall map of England
(iii) Duplicated note sheets for class (or on board to copy)

Sheet 96 The Pennines 1 inch = 1 mile

The Pennines are a very large area of in England Many small streams (shown) drain the hillsides, to join larger rivers (shown) such as the River Main (shown) and railways (shown and), and sometimes even canals ( ), follow the river valleys The also lie in the valleys

Even the minor roads ( ) avoid the hilltops, for these are moorlands such as Moor and Moor Here only footpaths ( ) are found The chief vegetation of the moorlands is , and coarse grass or ( ), but there are many patches of ( ) In some places woods ( ) lie on the steeply sloping valley sides

PICTURES

It would be difficult to dispute that maps are of primary importance to the geographer and the geography teacher For the latter particularly, pictures are a very close second The sudden disappearance of pictures today would be almost as great a loss in the classroom as the disappearance of maps The reason is not far to seek The raw material of geography is the surface of the land, or the landscape, and pictures are the simplest and most direct method of importing this material into the classroom Ideally, much geography should be studied directly in the field, but the great majority of teaching time is inevitably spent inside school Pictures form an essential and vital link between outdoor and indoor study They encourage field work methods in the classroom Indeed, sometimes more successful analysis of landscape can be carried out indoors with the right picture than upon a bleak and windy hillside with the real thing

Pictures also play an important part in making geography real for children The insistence on the importance of reality in geography was one of the most powerful ways in which Fairgrieve influenced its teaching A part of his statement about geography 'to train future citizens *to imagine accurately* the conditions of the great world stage' is relevant here There is still frequent evidence that children either do not know what the places they are studying are really like, or have distorted or peculiar images of them

This point deserves some clarification Children are often said to have great powers of imagination This usually implies a creative meaning, of making up new ideas This is not the imagination we should strive for in geography teaching, though its importance as one aspect of the child s general development cannot be denied When children fill in gaps in their knowledge with this creative imagination, they often make up quite incorrect mental images Fairgrieve was using the word in the sense of imagery Children should be able to call up correct mental images of other places, and this ability is clearly aided by ample

use of pictures Pictures will also correct any false images children may have formed through mishearing or misunderstanding verbal descriptions

From general principles of teaching, there is much to commend the use of pictures Children show considerable innate interest in looking at well chosen pictures, if only because this is a change from listening to the spoken word 'Visual impact' is perhaps unnecessary jargon, but it reminds us that children learn through the eye as well as the ear One must be careful also not to put too much stress on the entertainment value of pictures Their study offers as much opportunity for hard work as that of other material, and affords scope for various forms of activity They are not merely observed, they are considered and analysed, and a variety of exercises can be devised to this end Finally it should be noted that pictures are comprehensible by the illiterate, and there is much scope, not yet fully explored by geographers, in the use of pictures in geography teaching to children of low ability

In popular speech the expression 'visual aids' often carries an implication that the most modern methods are being used Geographers have been trying to use pictures at least for most of this century The advent of the filmstrip projector and the colour slide has meant more to them than perhaps to any other teachers There are references to pictures and projection methods in the *Geographical Teacher* from its very first number in 1901 onwards In 1926 Fairgrieve's *Geography in School* devoted a chapter to the use of lantern slides An examination paper set by Stamp and Suggate in 1933 used a picture, this form of examination question is now a usual and widespread style

There are now few technical or financial difficulties The filmstrip projector is a standard piece of equipment, light, portable, easily handled and requiring little technical knowledge or maintenance The old difficulties of the epidiascope, which required a good black-out system for effective use, have disappeared There are a variety of machines which now provide daylight projection Material is also in good supply Many commercial companies provide cover of every geographical subject, and there is an ever increasing number of teachers who are photographers The camera today almost rivals the theodolite as a geographical tool, and many teachers have their own colour slide collection These projected pictures are readily available for the whole class to study as part of the lesson There

is also a good supply of printed pictures from commercial sources, although the cost of these sometimes prohibits their great use in class There is material to be collected from the many illustrated popular and technical journals These usually provide single copies which cannot be studied by the whole class at once, and different styles of lessons are needed for their use

There are, broadly, three different classroom procedures which arise from the supply situation These are viewing by the whole class, viewing by groups and viewing by individuals Pictures which the whole class can see at once can be incorporated into the normal teaching lesson These are the projected picture, the text book illustration, the large poster-size picture which can be pinned up and the printed picture of which the teacher has sufficient copies to distribute The pamphlets published to accompany the B B C broadcasts to schools are the most convenient source of this latter type Where only a few small pictures are available, the group work system must be used This is considered in detail on page 170 Single small pictures can only be used in wall displays, and unless some positive steps are taken, there is no guarantee that any but the keenest will ever study them

The criteria of good geography teaching pictures are worthy of careful consideration That there should be useful and apparent geographical content is clearly the most important It is surprising that irrelevant illustrations, particularly of architecture, are still in use indeed, one widely used geography book contains a sketch of a fish skeleton on a plate The judgement of content will depend fundamentally on the teacher's own geographical perception

Pictures should be sharp and clear Children are distracted by strange shapes and blurs which they cannot identify With the best—or worst—intentions they will ask questions which will cause unnecessary, avoidable interruptions of the lesson The picture should be a straightforward one *A general view of, say,* a tractor ploughing a field will be more useful than the carefully composed dramatic shot which emphasises the tractor against the sky line and neglects the essential landscape setting The picture should also be typical A picture, striking in content, of unusual phenomena, may remain in the child's memory, leaving him with a false impression of an area Wherever possible human activity or interest should be included, at least for younger children A landscape scene alone, particularly of landforms,

is one which offers largely intellectual appeal Human figures also help the child to realise the scale of the picture When these are absent, some familiar object should be included for this purpose

Above all, the picture should be rich in content and lend itself to questioning With certain exceptions mentioned later, a good teaching picture should contain plenty of information for the children to discover A view of open, rolling chalk downland, with few obvious surface features, can be studied by a sixth-former as a piece of typical scenery, but offers few concrete points on which to focus the attention of first or second formers For this reason, the picture used solely to show what something is like must be handled with care If children have not seen an olive tree, a picture will describe it to them better than words Mere looking, however, is not enough Their attention must be directed to its shape, its colour, its leaves and its gnarled trunk

Air photographs are sufficiently common to merit special attention Interpretation of air vertical photos needs specialist training and the study of landscape by means of stereo pairs is at present confined to University level The equipment is not expensive, and a few well-selected sets of pictures would help advanced work The very large scale air vertical on the same scale as the 1/10,560 map, where available, can be an impressive aid to map-reading The low air oblique is one of the most valuable pictures for the geographer Problems of interpretation are few Sufficient detail of the landscape can be seen for accurate study of the facts, and a sufficient sweep of countryside to see the generalisations Landforms are often better seen from the low air oblique than from the ground level viewpoint An air view of the chalk cliffs near Swanage, for example, shows clearly how the structural forms which appear on the coast can be traced inland, in a manner quite impossible to see from a viewpoint on the ground. A low air oblique of Cheddar Gorge from the south is in some ways more dramatic and revealing than the gorge itself

The main principles of using pictures in the classroom have already been implied and can now be codified It is clear that pictures should normally form an integral part of the lesson, rather than a separate item of illustration at the end of it Pictures should be regarded as material for study They are used only as illustrations for items which are unfamiliar to children, about which they need to know These items may be plants,

products or other objects, samples of which are not available, pictures will present these as a valuable supplement to verbal description Apart from this, pictures are to bring geography into the classroom, and the teacher should condition himself to ask and not to tell

There are some minor exceptions to this principle The subject and location of the picture should normally be stated, and it may be necessary to clarify obscurities. It is legitimate to say, 'These dots are sheep' 'This dark part is a forest' Apart from this, the basic style should be not 'This picture shows a village at the foot of the slope' but 'Where is the steepest land? Where is the flat land? Where is the village?' An essential teaching skill is the framing of questions The right question gets the right answer, and this applies particularly to the handling of pictures The preparation for the use of a picture is the framing of the right questions which will extract from the class all the available information

The general geographical principle of observe, record, interpret is another useful guide to good classroom practice So far we have been concerned with observation guided by the teacher There is ample scope also for the children to record, and there are many different ways of doing this Straightforward written notes are the obvious but not the sole means They can be suitably classified, expressed as answers to questions, or used to complete tables or other proformas It is a good exercise in English for children to write a complete description of an area they have studied in a picture The line diagram which simplifies the picture is a convenient method of analysis and recording At first, the teacher will have to prepare this, or show how it is done by drawing it on the board More advanced classes can produce their own, and the ability to do this and to draw a field sketch goes hand in hand (Fig 8 and Plate 1)

Interpretation should form part of the whole lesson, rather than a separate item during the picture study, but where the picture is a major item in the lesson, classroom discussion leading to the explanation of the main features seen should not be forgotten

It seems appropriate here to offer an *ad hoc* classification of types of geography pictures which may prove helpful to teachers Simple facts are sometimes better presented by coloured picture than by words, textbook or blackboard diagram A soil section is a good example of this, and exact classroom analysis of the

facts seen instils better field work training than consideration of the blackboard diagram. Well chosen pictures of simple landforms are also more real than sketch or line diagram. In his blackboard sketch the teacher will, almost unconsciously, have simplified the facts suitably to the ability of the class, and pictures chosen must also satisfy this criterion. The example of new vegetation forms, already mentioned, is in this category.

There are a number of processes and activities which teachers need to describe, and a picture, presenting apparently three

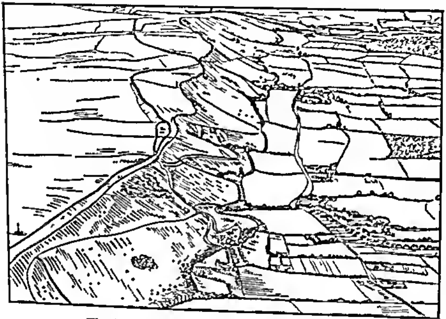


Fig 8. Field sketch of area shown in Plate 1.

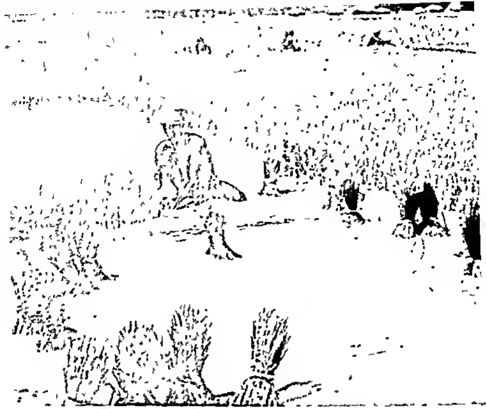
dimensions, is often more helpful than the blackboard diagram. Irrigation processes are an example. A scene common to many parts of the world is of the peasant cultivator watering his fields from small irrigation ditches. He blocks the ditch with his hoe so that the water floods out over a small area of land. When sufficient water has been given to the plants, he makes a new barrier some yards down slope, removes the first one, and the watering is repeated. This simple process, which involves a careful verbal description, is conveyed more clearly with the aid of the right picture. Where movements and continuity are involved, the ideal medium is the moving picture. Film loops of processes, or the appropriate section of a whole film, are the ideal in this

I CUESTA OF SOUTH DOWNS

II PENNINE MOORLAND WEST OF SHEFFIELD

III HOCHSOLDEN IN WINTER

IV HOCHSO[illegible]D[illegible]



VI RICE TRANSPLANTING IN LOWLAND INDIA

VII VILLAGE IN THE THAR DESERT

case, but are normally less readily available than the still picture for brief classroom use

The example given is representative also of a large group of geographical teaching pictures It shows human activity in its natural setting As man's relationship to his environment bulks large in the content of geography in school, many pictures should be used which demonstrate this The close up which shows the process only, for example a pair of hands pruning a grape vine, does not contain the necessary content The same view at medium distance will show sufficient detail of the process and include all the essential background, which in this case is often of local terracing

Perhaps the largest single category is the general medium distance view of a landscape, often from a raised viewpoint, which offers a great deal of information for study, and which may be a key point in a lesson Such a picture will justify several minutes of lesson time, and may need to be supplemented by only one or two other pictures to show detail The very low air oblique often provides such a scene *Plate 1* is an example Many essential facts about chalk downs and the adjacent lowlands can be obtained by analysis of the picture, the open rolling downland with its absence of trees and settlement, the steep slope with its different vegetation, and the village and field pattern of the lowlands Such a picture could be the foundation of a lesson on the structure and relief of south east England A picture which offers ample scope for questioning is Plate x Ideally this picture should be in colour, coloured pictures are steadily becoming available What are the trees on the skyline? What are the large circular objects below them? What are the peculiar structures on the far hillside? (Reference to the detail of them in the foreground will assist here) How many crops are growing on the valley floor? What are the different trees in the foreground? How has man made the hillside cultivable? Not all the facts will be known to the children, and *as necessary, they can legitimately be told* They are not likely to recognise the carnations in the valley, nor perhaps the olives and oranges They have, however, had their attention closely directed to the facts, and are thus in a position to consider further this example of intensive Mediterranean cultivation

The general purpose view of this type should be chosen as often as possible, to be representative of the region concerned The teacher must exercise considerable care here There is

evidence that children early form stereotypes in their minds (page 371) If these are correct, they are assisting in the development of accurate geographical concepts A proper form of progression in the development of children's geographical thinking would be the building up of images typical of major regions of the world, together with the realisation of the many local variations and sub regions which are elaborations of the major theme

The use of one such picture only, studied in detail and forming the basis of the lesson, is a development which the advent of the colour slide has encouraged, even permitted Thus a typical scene on the coast of Donegal, with its rock bound Atlantic coast, small patches of potatoes and grass, and whitewashed cabins set among low moorland hills expresses visually the personality of north-west Ireland A lesson based on such a picture embodies three important ideas It is studying the landscape, it is specific, it is regional

The picture which offers one striking teaching point, often in the form of a problem, should also be used A picture of a bridge over an obvious river valley, with no visible water, immediately brings out the importance of the rainfall regime The River Rhone, just below Geneva, with the water on the right bank side blue and clear, and on the left white and cloudy, poses a striking problem, which leads directly to consideration of the function of Lake Geneva as a settling tank for the masses of detrital material from the mountains

The seasonal pair of pictures should be used where obtainable River regimes and flooding are conveniently demonstrated The scene, from the same place, of a river at normal level, and in flood time, with traffic halted on the road, is not impossible to obtain In the teaching of climate, summer and winter, or wet and dry season pairs are in valuable, e g those of Plates III and IV.

There is considerable educational research which supports the principles for picture study here mentioned In an investigation into the attitudes of adolescent children towards the use of pictures in geography teaching, Honeybone[1] found that children liked pictures because they lent interest, excitement, clarity and a sense of reality to geography lessons They valued the opportunities offered to think about the material, and stated that they learnt more from seeing a few pictures than a lot They were also grateful for precise instructions and firm guidance in their picture study

A large scale investigation was carried out by the Training

College Section of the Geographical Association [2] The first part of the experiment was with ten year old children They were offered three simple landscape pictures, and their comments were recorded Nearly one thousand records, spread over 147 urban and 49 rural primary schools, were analysed, with the following results It would appear that the picture is not seen, primarily, as a whole It appears to be seen as a series of apparently separate and unconnected details, selected at random, haphazard These details are subject to careful inspection If the picture is not clear in any detail much time may be spent in an attempt to establish recognition If the feature remains unidentifiable, imagination is brought into play It does not occur to many children to query height, area or size in general This lack of realisation of scale apparently causes the majority of errors in recognition It would seem that, if something in a picture is either not clear or not known to a child, shape rather than size suggests itself as a solution In other words, shape recognition is stronger than size recognition It is not always apparent that the child, after inspection of detail, finally sees the picture as a whole

The final conclusions of this part of the experiment with primary school children can be summarised as follows

1 Photographs, to interest and attract the child, need to be bright and clear

2 Photographs showing a variety of detail may interest more than those lacking contrasts

3 Photographs may stimulate a desire to know more

4 Parts, not wholes, details, not a broad view, a general lack of integration characterises the child's approach to picture study

5 The ability to make simple deductions from pictorial data probably increases with age, experience and intelligence, but appears to be present even in some 10 year olds

6 Emotion plays a great part in the interest in and appreciation of pictures by children, but appears to play a decreasing part with increasing age Nevertheless it is probably always a potent factor in the learning situation

7 It would appear that young children show little natural interest in the causes of physical phenomena of the normal type selected for this particular pictorial representation

The second part of the investigation[3] was with children aged 11 to 16 years in grammar schools In this case two landscape pictures were chosen, each showing clear human response to the situation, and more detailed written statements were obtained

from the children The conclusions from the analysis are summarised

1 No one feature is recorded by all the children

2 No one child records, and therefore probably no one child sees, all the features in these pictures

3 Boys and girls, with some minor variations, appear to recognise the same features in these pictures

4 It would appear that more children observe, recognise or record features of human geography than of physical geography in these pictures

5 Children of the first five grammar school years are able to recognise a specific physical feature in a picture when invited to search for it, but in free observation they seem less likely to notice it. This phenomenon is by no means so well marked in the case of human features

6 Powers of observation do not necessarily increase with age, but recognition of what is geographically important is significantly greater in years 4 and 5 than in years 1, 2 and 3

7 This observation, or recognition, may be influenced by two major factors (a) the familiarity of the child with the features and (b) the location and emphasis of the feature within the picture

8 It would appear that as much as one fifth of geographical significance escapes the record—and probably the eye—of even the most observant 16 year-old, being either not seen, not recognised, not understood, not recorded or not regarded as worthy of comment

9 Children of all ages are able to discover what is geographically significant in pictures more readily if their search is guided

The more general findings of Dilworth[4] and Lovatt[5] are also relevant The experiments carried out by Dilworth employed the first and fourth year groups of a boys' secondary modern school, of a boys grammar school and the second year of a mixed primary school Some 24 frames of a filmstrip, specially constructed of representative pictures, were each projected in turn for 40 seconds with an interval of 1 minute 50 seconds between, during which pupils had to recall and note as many items from the previous picture as they could Although the experiment lasted for over an hour the effects of fatigue were only marked in the primary school group There appeared to be no improvement in scores either with age or with level of ability

In his thesis Lovatt concluded that the number of pictures shown in a lesson should be limited to 8 to 15 to avoid a progressive

lapse of attention, but there was no evidence to show that fatigue resulting from looking at a long series of pictures reduced the effectiveness of learning There was, however, clear evidence of a significant advance in the powers of perception and description above the mental age of ten plus Furthermore, whilst pupils do not appear to learn more from pictures shown in a darkened room, teachers appear to teach more effectively in a fully lighted one

It can be seen that the research findings are in harmony with the suggestions made earlier about the use of pictures The main principles for their every day classroom use can be enumerated First, picture study should be an integral part of the lesson Second, more than eight pictures should not be used in one lesson, and intensive study of even fewer is profitable. Third, picture study should normally be directed by questioning Fourth, some form of written record should normally be made It should be added that it is occasionally profitable, as revision, to show pictures of typical landscapes or activities to fifth and sixth form pupils as problem pictures The class, using its geographical knowledge, has to locate the area and give reasons for the choice of location This is an exercise they normally enjoy

Honeybone's research[6] indicated that first and second forms prefer studying pictures and writing about them individually The middle school apparently prefer projected pictures for oral class study. The older pupils appreciate individual copies of photographs for close scrutiny Although filmstrips are plentiful, there is little doubt that one of the most satisfactory sources of pictures is the well illustrated text book, and it is with text books that our next chapter is concerned

NOTES

1 Honeybone, R C 'An investigation into the attitudes of adolescent pupils towards methods of teaching geography' *M A, London, 1950*

2 Long, M Children's reactions to geographical pictures *Geography*, Vol XXXVIII, April 1953, pp 100–107

3 Long M 'Research in picture study' *Geography* Vol XLVI November 1961, pp 322–337

4 Ditworth, D A Filmstrips and fatigue A measurement of the decline of perception during the observation of a long series of pictures' M A, Birmingham, 1954

5 Lovatt, G W 'Teaching *with filmstrips* An enquiry into problems arising from the use of filmstrips in the teaching of geography' M A, Birmingham, 1955

6 Honeybone, R C *op cit*

LESSON 6

YEAR THREE ASIA (A FIRST LESSON ON INDIA)

AIM To show that India is a land of contrasts

MATERIALS REQUIRED

(i) Atlases
(ii) Outline map sheets for class (Fig 9)
(iii) Filmstrips CGA 348 Common Ground Ltd Frame 4 (Himalayas), Frame 22 (Rice planting in Ganges Valley) CGA 248 Frame 56 (Cattle at Scrub Waterhole) CGA 540 Frame 11 (Deccan east of Bombay)
(iv) Wall map of Asia or India (optional)
(v) Blackboard map outline
(vi) Text books (optional)

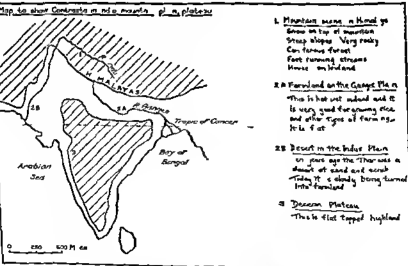


Fig 9 Child's completed map sheet lesson on India

METHOD

1 Introduction Locate India in Asia Locate India proper and Pakistan Together form Indian peninsula Meaning of peninsula? Surrounding seas? Tropic?

Class name seas and tropic on map [Check by adding to board map]

2 Size? Class use atlases measure N–S, E–W to get some idea of size Compare with known distance British Isles India so large that it has been called a land of contrasts We are going to find out today if this is true

3 Show CGA 348 4 Analyse by questions (*Mountains, snow, temperature, stream, forest, room for cultivation, houses*) Where in India must photograph have been taken? (*Somewhere in mountains*) These lie? (*To the north*) Called? Look atlas or textbook map (*Himalayas*) [Show highland on board map Shade in Locate picture on board map by writing figure 1 in correct place]
Class then shade in highland, name Himalayas, put 1 in correct place to show where picture taken Make own brief notes in first space, under title 'Mountain scene in Himalayas'

4 Show CGA 348 22 Analyse for contrasts (*Flat, rice cultivation, hot, ample water*) Flat area called? (*Plain*) Lowland shown on atlas? (*Green*) This picture taken Ganges Valley [Insert 2A on board map]
Class name R Ganges, add 2A, and write notes on picture under the title 'Farmland in the Ganges Plain' [Meanwhile teacher changes filmstrip]

5 Not all plain is farmland Show CGA 248 56 Analyse by questions (*Difficulty of finding water for cattle, lack of vegetation, scrub of desert edge, flat*) Is part of Thar desert borders If want to improve land here, need? (*Water*) Could get it from? (*R Indus*) Ten years ago this area desert, now gradually being irrigated to turn it into? (*Farm land*) [Insert 2B on board map]
Class name R Indus on map, insert 2B, and write two sentences on area [Teacher meanwhile changes filmstrip]

6 Show CGA 540 11 Analyse to emphasise is a plateau Locate—can't be in high mountains of Himalayas? (*No, too level*) Not in plain? (*No, too high*) So is here [Indicate on board map Shade in Deccan Insert 3]
Class shade in and name Deccan, insert 3, and devise one sentence about Deccan

7 Conclusion We have seen four pictures of India What are the kinds of land we have seen? [Indicate] Here? (*High Mountains*) Here? (*Desert*) Here? (*Farmland*) Here? (*Plateau*) Can we then call India a land of contrasts? (*Yes*) The main contrasts are? (*Mountain*) and here? (*Plain*) and south? (*Plateau*) Add title to your map 'A map to show contrasts in India—mountain, plain and plateau [Add title to board map]

N.B This lesson was originally devised using B B C pamphlet pictures, (Spring 1958) We thought that filmstrips might be more generally available Nevertheless, the lesson could be given using appropriate pictures from any source It can be followed using Plates v, vi, vii, and viii, two of which are from the filmstrips referred to, and two from the pamphlet

LESSON 7

YEAR TWO SOUTH AMERICA (PERU—FIRST OF TWO LESSONS)

AIM To discover the importance of water to man on the Pacific coast of Peru

MATERIALS REQUIRED

(i) Atlases
(ii) Duplicated copies of extract given below, or could be read aloud only
(iii) Coloured chalks

MAN AND WATER IN PERU

Adapted from an article by Arnold Toynbee (*The Observer*)

We were standing at the head of a bay on the south side of the Paracas peninsula, which juts out into the Pacific from the coast of the fifth valley south of Lima If it had not been for the sea it might have been on the moon

The beauty of the landscape was unearthly The pale gold desert undulated like the back muscles of a puma The sky, bay and ocean were pale blue Sharp lights and shadows flickered over the cliffs and headlands The tops of the jagged guano islands gleamed white How could this landscape support life?

Coastal Peru is a tawny desert cut, at right angles to the coastline, by sinuous ribbons of green The art of valley irrigation is to carry the life-giving water to the maximum altitude, and this means leading it out of the river bed into irrigation channels starting far up the river's course. The yellow desert soil is rich in the chemicals that will nourish vegetation. Nothing but the magic touch of water is needed to make crops spring into being

Up to the limit of the irrigator's reach, these southern valleys are thick with cotton, bananas, figs and vines (a marriage of the tropics with the mediterranean) But the line between the desert and the sown is dramatically sharp At life's edge you can stand with one foot in fertile mud and the other in desiccating sand Every drop of water must be channelled to its destination, for, down here, the rain never falls, though, as one looks up the valley towards the source from which the river descends, one always sees the leaden rain clouds lowering over the farthest visible peaks Up there, they say, the mountain sides are terraced into fields that are watered, not by man, but by Heaven But I have still to see that lofty homeland of the potato and the llama

METHOD

1 Class reads through passage silently

2 Using atlases, class locate where view is (*S of Lima . Paracas peninsula*)

3 Teacher reads passage aloud to class, asking questions to make sure class understand it

4 What is this a description of? (*Coastal area of Peru, south of Lima*) If we were to draw a sketch of the things we have found out about the coastal area of Peru, what would we have to include? Class suggests the following, to be listed as summary on the blackboard (i) jagged islands, (ii) ocean (*pale blue*), (iii) coast, cliffs and headlands, (iv) the irrigated valleys (*green*), (v) the desert in between the valleys (*pale gold, i e yellow*), (vi) the Andes in the background with cloud cap

5 Sketch drawn on blackboard, and by class, to show the six features named Class select title, e g Coastal Scene in Peru [Add to blackboard sketch (Fig 10)]

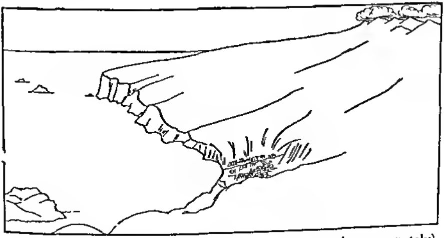


Fig 10 Blackboard sketch for lesson on Peru (coloured appropriately)

N B This lesson was originally devised using B B C pamphlet pictures, (Spring 1958) We thought that filmstrips might be more generally available Nevertheless, the lesson could be given using appropriate pictures from any source It can be followed using Plates v, vi, vii, and viii, two of which are from the filmstrips referred to, and two from the pamphlet

LESSON 7

YEAR TWO · SOUTH AMERICA (PERU—FIRST OF TWO LESSONS)

AIM To discover the importance of water to man on the Pacific coast of Peru

MATERIALS REQUIRED

(i) Atlases
(ii) Duplicated copies of extract given below, or could be read aloud only
(iii) Coloured chalks

MAN AND WATER IN PERU

Adapted from an article by Arnold Toynbee (*The Observer*)

We were standing at the head of a bay on the south side of the Paracas peninsula, which juts out into the Pacific from the coast of the fifth valley south of Lima If it had not been for the sea it might have been on the moon.

The beauty of the landscape was unearthly The pale gold desert undulated like the back muscles of a puma The sky, bay and ocean were pale blue Sharp lights and shadows flickered over the cliffs and headlands The tops of the jagged guano islands gleamed white How could this landscape support life?

Coastal Peru is a tawny desert cut, at right angles to the coastline, by sinuous ribbons of green. The art of valley irrigation is to carry the life-giving water to the maximum altitude, and this means leading it out of the river bed into irrigation channels starting far up the river's course. The yellow desert soil is rich in the chemicals that will nourish vegetation Nothing but the magic touch of water is needed to make crops spring into being

Up to the limit of the irrigator's reach, these southern valleys are thick with cotton, bananas, figs and vines (a marriage of the tropics with the mediterranean). But the line between the desert and the sown is dramatically sharp. At life's edge you can stand with one foot in fertile mud and the other in desiccating sand. Every drop of water must be channelled to its destination, for, down here, the rain never falls, though, as one looks up the valley towards the source from which the river descends, one always sees the leaden rain clouds lowering over the farthest visible peaks. Up there, they say, the mountain sides are terraced into fields that are watered, not by man, but by Heaven. But I have still to see that lofty homeland of the potato and the llama.

METHOD

1. Class reads through passage silently.

2. Using atlases, class locate where view is (*S. of Lima . . . Paracas peninsula*).

3. Teacher reads passage aloud to class, asking questions to make sure class understand it.

4. What is this a description of? (*Coastal area of Peru, south of Lima*.) If we were to draw a sketch of the things we have found out about the coastal area of Peru, what would we have to include? Class suggests the following, to be listed as summary on the blackboard: (i) jagged islands, (ii) ocean (*pale blue*), (iii) coast, cliffs and headlands, (iv) the irrigated valleys (*green*), (v) the desert in between the valleys (*pale gold, i.e. yellow*), (vi) the Andes in the background with cloud cap.

5. Sketch drawn on blackboard, and by class, to show the six features named. Class select title, e.g. Coastal Scene in Peru. [Add to blackboard sketch (Fig. 10).]

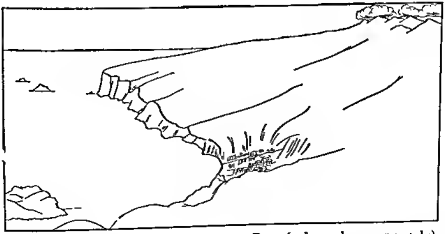


Fig. 10. Blackboard sketch for lesson on Peru (coloured appropriately).

6 Which are the most important areas to man shown in the picture? (*The irrigated valleys*) Why? (*Because man lives there, they produce crops*) Class list irrigated crops in notebooks [Can add others given in text book]

7 These irrigated valleys are the only signs of man living in the area What was the question the author asked himself in paragraph 2? (*How could this landscape support life*) How can it? (*Only by water*) From? (*The rivers*) What is the source of river water? (*Rain and melting snow of the Andes*)

8 Conclusion Man's life in the desert areas of Peru depends entirely on river water coming from the rains and melting snows of the Andes

Homework Write a short account of 'The importance of water to man on the Pacific coast of Peru'

CHAPTER 6

TEXT BOOKS

THE *Concise Oxford Dictionary* defines a text book as 'manual of instruction, standard book in a branch of study' For schools a more liberal definition is required To regard school texts in the narrow terms of the dictionary definition would surely imply some insistence on formal education In our context, a practical definition of a text book is any school subject book used by a child for study purposes

The text book is all too commonly regarded as something which the child should attempt to learn by heart, or as the only book on a given subject which he needs to read Yet the different styles of geography text books available should surely inspire more fruitful appreciation At levels below the sixth form there is first the factual account, the straightforward, comprehensive, unselective version of the geography of a given area This type of book tends to be studied by the private student It commonly contributes to the regurgitation of information in examinations Perhaps the main case for this type is that of the authoritative factual account by the expert, which becomes recognised as a standard work, and is most happily used by undergraduates Similar simpler versions are used by sixth formers, who need factual content For younger children more than a mere factual text is necessary This second book is commonly one of exercises on aspects such as map reading or picture study These books tend to encourage the breakdown of geographical study and lead to the divorce of map and picture work from their true context within the region A third type of school text is somewhat similar to the first, but is frequently nowadays a teacher's version of what geography he thinks should be known to children The teacher author suggests that this is what should be studied of the geography of a given area, and by his order of content suggests the order of study Sometimes such books are offered as appropriate for a given age level, sometimes not The fourth type, less common, is the pure source book, such as the early volumes

15 To what extent does the presentation of the text book take account of new principles and methods of teaching based on recent progress in educational science (pupil's interest, and activity centred teaching methods, etc)?

16 Does it stimulate students' further interest in studying and getting to know other countries and cultures?

17 How far do the exercises provide for the testing and application of knowledge and lead to practical activities? How far does the content allow for correlation with other subjects?

18 Are the aspects of ever increasing interdependence of nations and the need for international understanding and co operation given due attention? Does the text as a whole make a positive contribution to the development of better international understanding?

19 How far are the content and vocabulary adapted to the interests and mental capacity of the pupil? To what extent does the book encourage practical outdoor observations and map reading skills?

20 What are the outstanding features of the book as a whole as regards its content, presentation, typography, illustrations, binding, etc?

These questions are concerned with four aspects—objectivity, accuracy adequacy and up to dateness Within objectivity is concern that the material should be based on sound scholarship, and be free from bias, prejudice and narrow pre conceptions International understanding is a sphere of influence which, perhaps unfortunately, receives relatively little direct attention in our text books It is probable that few authors deliberately steer their writing towards its promotion, but it is certain that no British geographer would use a school text book as a platform for political denunciation or for the inflammation of controversial issues It is to be hoped that our children are not presented with bias or prejudice

Accuracy is of vital importance In text books there should be no erroneous or misleading statements Terms used should be defined accurately and clearly, illustrations should be representative, accurate and up to date It is not always easy for the non specialist to know how far a text book is accurate, the status of the writer may be useful as a guide Good writers check and re check their facts with known authorities, and most manuscripts are read by several experts before printing Some text books, however, are prone to wider generalisations than others

Sketch maps are sometimes inaccurate, more often they are crowded with general information which is in itself a negation of good geographical presentation Such generalised maps are sometimes due to economy on the part of the publisher, who wishes to keep down costs by printing as few maps as possible In modern text books illustrations are normally up to date, they rarely suffer from such handicaps as being too small or too badly printed for clarity

Adequacy as used by Unesco implies that 'the information should cover basic, essential and significant facts about the country treated in a comprehensive and balanced way' Some of the text books devised for less able children fall far short of this standard The facts selected are often the picturesque rather than the typical, and efforts at reducing the text to a bare minimum may result in geographical travesty, or factual precis of *inordinate dullness Attempts to present balanced* information are sometimes sacrificed by an appeal to what is thought to be of interest to children, sometimes in the form of cheap humour, sometimes in colloquial terms not of educational standard Text books for more able children are, on the other hand, likely to suffer from too much factual material, for which descriptive writing and the reality of geography is sacrificed, so that balance is lost

Up to-dateness propounds far more serious problems The good author presents statistics and factual information which is up to date at the time of going to press, but geographical circumstances change with great rapidity, and it is likely that information soon lags behind actuality Fortunately the general pattern of statistics such as of trade, land use or production often remains similar over the years It should be borne in mind that statistics are seldom meant to be learnt, and are used mainly as a yard-stick for comparisons and contrasts The economic need to use the same text book in school for a period of years inevitably results in out of dateness, to the teacher falls the duty of keeping up to date, so that serious deviations in statistics or other information can be amended The availability in libraries of source books of statistics such as *The Statesman's Year Book*, *Whitaker's Almanack* and the United Nations' *Statistical Year Book*, together with the publication of yearly summaries such as *Geographical Digest* (Philip) and the section 'This Changing World' in *Geography*, simplifies this task

It is probable that the geography teacher will want more than

the objectivity, adequacy, accuracy and up to dateness so far considered He will anticipate a style not only scholarly but interesting, couched in language both understandable by and stimulating to the age level he has in mind He will seek not only accurate, up to date pictures, but pictures of maximum geographical content which lend themselves to questioning and themselves provide data This data, linked to the text, will be of greater teaching value than mere illustrations He will expect statistics presented in a variety of ways, each a sound example of technical skill in production He will require diagrams of physical geography to be of real examples, named and located, not imaginary idealised drawings of unreal features He will look not only for factual information but for geographical description which helps the child to imagine vividly and accurately the landscape and human activity thereon He will appreciate graded exercises which can be worked by all members of his classes, exercises which are linked with the text, enlightening essential points He will expect all this of the text book of his choice, presented in an attractive form

Finally, the teacher is influenced in his choice of text book by his own method of approach in teaching, and normally selects the book which in this way is most useful in his scheme of work He may like to use sample studies occasionally, and will look for a book which presents some examples He may wish to use large-scale maps for the basis of his regional teaching of this country, or to use topographical maps of other countries More of such maps are now available in text books If his course includes the use of passages from literature which present in vivid terms the real flavour of a landscape, he may be encouraged to find such passages available in a class text There is little doubt that the geography teacher of today requires far more than gazetteer qualities in a text book, he requires a scholarly presentation of facts, variety in that presentation, and supporting data of every type likely to be of use in the geography lesson

The use to be made of the text book is a challenge to the good teacher The book is a tool for the child It should be used as such, and not dominate course work merely as a source of reading material The book should be used where it provides information not readily available in any other form, and only those parts used—be they paragrapb, or even sentence—which have direct bearing on the problem of the lesson in hand It is not necessary to follow slavishly chapter by chapter nor to maintain the order

of the chapters by taking lessons in similar order Every teacher is aware that to set a chapter as reading homework is to invite the unreliable to avoid the task Foreknowledge of a test to be set may provide a degree of compulsion, but it is often difficult to link such a test usefully into the planned lesson Reading aloud round the class is normally uneconomic use of geography lesson time, for those who are not reading aloud are not always following If a methodical rotation of one paragraph per child in order round the room is pursued those whose turn is to come are often preoccupied with what they will have to read aloud rather than with what is being read

In lessons, the relevant parts of the text may be read silently, and oral or written questions asked about them Text books can be used to train children in note taking In any one chapter each paragraph can be reduced by the child to one or two short sentences which precis the vital points A class summary which collates the most concise sentences rounds off this worthwhile exercise This type of work trains the child not to rely on text book phrases and helps to eliminate tendencies to copy straight from the book The words used to describe for example the relief of an area may be noted and analysed and used in describing another relief area encouraging the children to apply what they have learnt Questions can be asked the answers to which are to be found in the text If the questions are logically ordered and full sentences are required in answer, the result is often in the form of a well ordered essay The industries of towns in a major industrial area can be tabulated from the text, columns for comparison of various aspects of two different regions can be built up in the same way A seasonal description of work in an agricultural area can be reproduced in diagram form as a year s calendar, normally drawn as a circle to emphasise the cycle of work A careful description of an area in a text may lend itself to mapping, an exercise of interest to older children Young children may find it useful to illustrate such passages by means of drawing

An excellent exercise can be devised from the use of a text book map The map is studied and a blackboard list made of the features shown The list is analysed and any features not essential to the purpose of the map are discarded The map is then re drawn by the children including only the features remaining These may be improved by the discreet use of colour or by diagonal lines instead of stippling according to the map being re drawn

Additional essentials not found on the original can be interpolated The study of a map to find out what it actually shows, and what can be deduced from it, is one which could receive more attention than is normally given

From pictures simple field sketches can often be drawn, and annotated to clarify important points It is worthwhile to encourage children to write a description of a text book picture, since descriptive geographical writing requires constant practice Drawings of crops may also be made from photographs, or sketches of house types Analysis of what is typical in a picture is useful When children can locate a picture from its geographical setting they are on the way to becoming geographers It is also possible to draw maps from simple photographs Another exercise is the sketch section drawn from a photograph, perhaps to emphasise relief or to show land use Where structure is known, a block diagram can be drawn, this is a useful exercise for older children

Temperature and rainfall statistics for given stations can be graphed but such graphs should always be annotated to ensure that vital characteristics are understood Bar graphs or pie graphs can be drawn from production or trade figures, these too should be annotated Lists set in alphabetical order can be reset in order of value, this simple exercise often makes a useful introduction to a lesson Statistics may sometimes be expressed in words, their significance being emphasised by appropriate adjectives The data shown in graphs can be calculated in figures These alternative forms of interpretation are means of impressing what is significant on the child s mind

It will be seen that the text book in class is seldom used as a whole, appropriate parts are selected for study The reading of whole chapters is often of greatest use as a form of revision, or in an emergency when extra work has to be set for which little provision can be made Even then the work normally has greater value for the child if his attention is drawn to salient points by means of questions or exercises which ensure that he understands and can make use of what he reads Some modern books provide exercises as an integral part of the text These exercises are often too numerous for any one child to complete They are meant to provide a selection from which the teacher can extract those suitable to his purpose, at the mental level of his particular class

The uses to be made of the text book will be a further guide

to the teacher in his selection Text books express the writer's ideas on how geography should be taught, or are the ideas of a team of writers under an editor *It is* not likely, therefore, that the teacher will find a text exactly fitting all the ideals he seeks He is advised to read the preface to see if the aims of the author are similar to his own, then to see if the book fulfils its aims He should look at the text to see if the words used and style of writing are suited to the age range *stated, if no age is indicated* he must be particularly cautious It is probable that no teacher should use only one series throughout the school life of the children, this would be equivalent to studying the works of only one author in English literature It is convenient to have spare sets which can be used when they illustrate an area or topic particularly well Even discarded sets are often valuable for this purpose Books can be exchanged between forms for lesson periods, fifth forms often enjoy revising from a third form text book with which they are unfamiliar Fortunately, the high standards demanded of modern text books by teachers are ensuring an ever increasing number of books with greater teaching—and learning—potential than those of pre war years

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LESSON 8

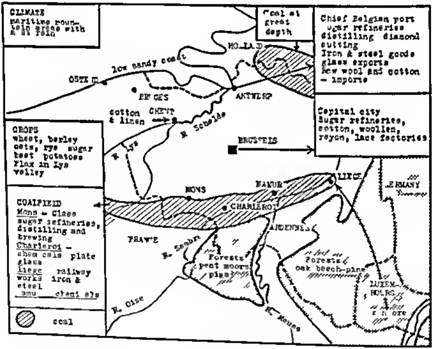
YEAR FOUR EUROPE (BELGIUM)

AIM To locate the industrial centres of Belgium

MATERIALS REQUIRED

(i) Class copies of generalised map of Belgium in text book (Fig 11)

(ii) Atlases



Map of Belgium

Fig 11 Example of text book map of Belgium

METHOD

BOARD SUMMARY

1 Have text book map showing considerable amount of information about Belgium It is called? (*Map of Belgium*) Actually the map

includes also other countries—list these in notebooks Are? (*France, Holland, Germany and Luxembourg*)

How is the boundary of Belgium shown? It is not in the key—(*By dashes*) Check in your atlas for parts not shown These lie in? (*North east and north west*)

1 Draw outline of Belgium

2 How are rivers shown on the map? (*By black lines*) Make a list in your notebooks of the Belgian rivers shown Are? (*Lys, Schelde, Sambre and Meuse*) Find these rivers in your atlas What happens to the R Meuse not shown on your map? (*It joins R Rhine*) It is a tributary of the R Rhine

2 Add rivers

3 The stippled area is not explained in the key What does it represent? (*Highland*) Look on atlas map for height? (*Much is 600–1,500 feet, but rises to 3 000 feet*) What are these highlands called? (*Ardennes*)

3 Add high lands and key

4 Make a list in your notebooks of what your map is trying to tell you It includes facts about? (*Industry, agriculture, natural vegetation, raw materials*) and even? (*Climate*) Which of all this is the most in evidence? (*Industry*) The map we are going to draw will therefore deal only with industry We shall need to put in first? (*Coal fields*) Where are these located? (*One at edge of Ardennes*) This extends into? (*France*) A second lies? (*On north-east border*) This extends into? (*Holland*) The first is called the Franco Belgian Coalfield, the second is the Campine coalfield

4 Add both coalfields and key

5 Do we need to show towns on our map? (*Yes*) Why? (*Are the industrial centres*) How do you know this? (*From notes*) How are they shown? (*By black dots*) Then why is Brussels shown as a square? (*Because it is the capital*) Has it industries? (*Yes—sugar refineries, textiles*) Are there any other industrial centres not on the coalfield? (*Yes, Ghent and Antwerp*) There is also one town shown on your map which is not industrial? (*Ostend*) We shall omit this In your notebooks make a list (a) of towns on coalfields and their industries, (b) of towns with industries

5 Add dots to represent industrial centres and key but *do not name*

but not on coalfields The towns are? (*Mons, Charleroi, Namur, Liège, Ghent, Antwerp, Brussels*)

6 Class draw 'A map to show the industrial centres of Belgium', naming these	6 Add title agreed by class

CHAPTER 7

SAMPLE STUDIES

This chapter, devoted to sample studies, might logically follow work concerned with study in the field, rather than precede it. It is presented here because sample studies, like the maps, pictures and text books of the foregoing chapters, are part of classroom study, and complete the section on such activities.

Most geography teachers are familiar nowadays with the term 'sample studies'. These studies have been used with growing frequency during post-war years. Despite the establishment of recognised techniques which have increased their teaching potential, sample studies may still be considered, in the educational sense, as a relatively novel means of providing reality in geography lessons. A summary of their development will indicate the evolution of their use in teaching, exposition of their application to the classroom situation will reveal a particularly illuminating method.

The description of places and areas has formed the record of explorers, surveyors, travellers and geographers for very many years. With the development of geography as a scientific study these descriptive records became more detailed as the study grew more intense and the specific area, of necessity, smaller. The details recorded became more purely geographical and more accurately stated. Many of the studies were of areas highly localised or individual in character, and were recorded in academic terms not readily encouraging their inclusion in school work or in school syllabuses, for which, of course, they were not intended. The development of field work peculiar to the geographer increased studies of areas at home and abroad, often published with the specific intention of encouraging field work apart from their value as contributions to geographic record.

In the field of human geography, Herbertson, as long ago as 1899,[1] drew attention to the study of specific sample societies, following the ideas of Geddes and Le Play. Schoolwork on the Kirghiz, the Masai and the like had become fairly common in

the early part of this century But it was Jean Brunhes[2] the French geographer, who initiated the method of 'sampling' His book *La Géographie Humaine*, published in 1910, reached its fourth edition in 1934, and presented detail of what he called 'human islands' The 'islands' varied in location from the highlands of the central Andes to the Val d'Anniviers of the Alps, from oases of cultivation in western South America to the oases of Souf and Mzab in the Algerian Sahara They were detailed geographical studies of small areas It was perhaps his influence which led to the appearance of articles such as those of 'The Suq',[3] 'The Jezera'[4] and 'Katsina'[5] in the nineteen thirties It is significant that no mention of teaching method was made

James Fairgrieve was also developing this principle For many years he had been speaking of the importance of specific detail, which could give reality in children's minds to geographical study One of the earliest explicit statements is by him in his Presidential Address[6] to the Geographical Association in 1935 'What I mean will be clearer if I refer you to a particular example, it was, in fact, written for adults, but it seems to me to have suggestions for school teaching It is given in the *Geographical Teacher*, Autumn 1924, and is entitled "Farming in Tuscany" (Donald Gray) The farm described is obviously a particular place, it is not just any place around the Mediterranean, and certainly not an exceptional place, it is typical of its immediate region on the one hand and of the whole Mediterranean on the other I go so far as to say that, if pupils must learn by words, they will learn more of the Mediterranean region by learning these words than by learning the same or double the number of words of textbook generalisations about the Mediterranean Notice also that here we have that detail which is the lifeblood of all teaching, because it is particular ' His textbook series *Real Geography*[7] is clearly the development of this idea The first book appeared in December 1939, but war inhibited further progress, and it was not until after the war that the series was on the market in quantity It is noteworthy that there were many exercises bearing on the material offered, and he clearly intended this series to be study books for children Emphasis on generalisation comes at the end of each book Surprisingly, there are few maps of actual places

The Fairgrieve tradition was continued by Scarfe, and we find him writing in 1942 [8] 'The chief features of the latest text books are the precise, accurate details of particular farms, factories or settlements, which are chosen as typical of a larger

region These special samples are actual and real ' His students, among them one of the writers, were giving sample study lessons from at least 1939 onwards Such a lesson was given by Boultwood at a conference for the purpose of discussion in 1944 Cons at Goldsmith's College helped develop this idea The best known example was his broadsheet of a cocoa producing village in Ghana, drawn up for a chocolate manufacturing firm This was one of the earliest specific studies commonly in use It is interesting that Mackinder[9] should have been thinking along similar lines 'There have been some valiant efforts to plan a symmetrical arrangement of natural regions which should cover the entire surface of the globe none has attained general acceptance There is always the difficulty of zones of compromise for boundaries My plan would be to abandon such regions, except the initial home region, and substitute focal points, from each of which the visualising and rationalising eye can sweep over gradually widening areas '

Detailed material for classroom study was still, however, not widely used, and evidence suggests that, even where used, its full value was not yet comprehended A discussion[10] at the Annual Conference of the Geographical Association in 1944 included consideration of 'a method of teaching based on material collected by the Empire Article Exchange Society' This material consisted of extracts from vivid first-hand descriptions of schools, climate, houses and of the cultivation of rice and rubber in Malaya, provided by Malayan children Such extracts 'are read and the children *told to make notes* * The lesson is completed by showing pictures by means of an epidiascope to summarise and illustrate the main points A second consolidating lesson follows ' The field study approach in the classroom had not yet arrived

From 1945 onwards there was rapid development The first article[11] written to expound the method was by Hickman in 1950 Illustrating her points from an original study in North Sweden—Djupviken—and the development of Kiruna, she suggests that the use of these as 'core study would be in the development of an understanding of the physical setting in the Arctic and sub Arctic', and adds that sample studies should show the simple response to the physical environment Disadvantages of the method are recognised as including the possible inaccessibility of material to teachers, and the diminished value of the study if visual material in the form of pictures and diagrams

* Author s italics

is not available The I A A M bandbook[12] on the teaching of geography had, in its reprint of 1952, a short paragraph on the use of sample studies, but only in the section on modern schools The B B C[13] in 1950–1 made a wide review of geography in schools, and examined as a random sample nearly six hundred syllabuses They report (on page 13) 'There was some conflict of opinion (at the secondary stage) between those who advocated detailed examination of small, reasonably representative areas—"sample studies"—and those who preferred broad generalised outlines of whole regions' This would appear to indicate substantial awareness of the existence of sample studies, but failure to appreciate the importance of classroom analysis of material is still apparent One critic says[14] 'As a sample study this broadcast on lumbering in Oregon was good and proved of great interest Its general interest was much greater than its geographical value I realise that broadcasts aim at presenting pictures of life and work of the people, but from my own point of view, I would like to see more "geography" in the series' The presentation of a nice balance between strictly geographical data and subsidiary supporting detail may be a problem taxing the selective faculties not only of the B B C but of the classroom teacher, yet surely the art of handling the sample study is to lead children to see geographical relations from the raw material presented

The Geographical Association Conference of January 1956 saw the introduction of a lesson and an exhibition based on sample study material, suggesting how it might be used in class This emboldened the authors to write an article,[15] the substance of which is included here, indicating underlying principles and including definition of sample study A sample study is a detailed study of a unit, chosen particularly to show human response to environment, and chosen so as to be typical of the major region concerned In the classroom, the word 'study' must be taken in its active sense Geographical details should be presented in a variety of ways so that children may make for themselves con clusions concerning man and the world be lives in

We can be catholic in our choice of samples, there is a wide range Clearly the farm, with its unity and close relationship to the land, lends itself well It is surprising how rarely a farm does not conform to local pattern The village, parish or com parable administrative unit is also of convenient size, and offers scope for the study of wider relationships Small towns can be used, provided local details of site, houses, activities and markets

are available A factory can be chosen, again provided its site and growth are analysed, rather than the processes which occur within it In the absence of a readily defined unit, any small section of land is not impossible of sample treatment—a mountain-side, a block of streets in a town, a particular landscape—though geographical units are obviously to be preferred That sample studies are normally of units conveniently lending themselves to field study is not surprising A sample study is frequently based on the detailed records of field study adapted for use in class because outdoor study by the class of the particular area or unit under consideration is not feasible

The past two decades have produced ample opportunity for an increase in the use of sample studies Not only has the number of detailed studies generally available increased, but their function as a sound means of teaching from the particular to the general has been recognised The classic development of sample studies is by Platt in *Latin America* [16] *Suye Mura, a Japanese Village* by Embree[17] is another classic, oriented towards sociology Many advanced regional geographies, such as *China's Geographical Foundations*[18] and *Japan*[19] contain detail which can be adapted for sample studies Other such studies are included from time to time in *Geography*, and the Geographical Association has produced five studies in a booklet entitled *Sample Studies* [20] This is particularly helpful as the studies have been produced with an eye for teaching, and there is a very useful detailed appended list of available studies A second book on Asiatic sample studies is in production A recent American book *Case Studies in World Geography*, edited by Highsmith,[21] includes many farms and sample areas Numerous school texts now include sample studies, the *Real Geography* series by Fairgrieve and Young (Philip) and *Many People in Many Lands* by Forsaith (University of London Press) being based thereon There is the series *How People Live*, edited by Tubbs and published by E S A The Association of Agriculture has expanded from British farm studies to include farms in Australia, Canada and Southern Rhodesia, although not all the detail given is relevant to geographical study *Progress*, the magazine quarterly of Unilever Limited, not infrequently includes sample studies, port studies of Marseilles and Rotterdam being outstanding examples Associated Rediffusion's television programmes for schools in 1958 included La Dordogne the story of a river', which was a sample study on film, the teachers' notes provide relevant detail

Studies in the field, either at home or abroad, provide much first hand detail for use as sample study in the classroom Indeed, the detailed reports of field geographers bulk large in any list of sample studies The Dalarna studies[22] of the Le Play Society, the Kuogalv studies[23] of the Geographical Field Group, are typical Much of the detail of the coloured Common Ground filmstrip, CGA 696 'Village Life in Northern Italy', was derived from photographs taken on a field excursion Many films have been produced as the result of a geographer s field work—'The Rhone Valley' and 'The Rhine' are examples[24]—whilst the heart of films like 'The Rice Growers[25] is study of one family's life, and that of 'A Story of Coffee' offers detail of a typical fazenda These field studies normally serve as samples in the classroom ooly if they are typical of a reasonably large area, such as is normally studied in a school course

For example, a field trip to Tarascon involved study of the Montagnette, the Alpilles, a primeurs vine-olive farm, the Languedoe and lower Rhone irrigation project, Avignon, Arles and the Camargue As the syllabus (page 299) indicates, time permits in year four no more than two lessons on the Rhone Valley and the Mediterranean coast of France, with an extra lesson partly devoted to a study of Marseilles The sample farm could be used as an introductory study of agriculture in the Rhone Valley, since it illustrates clearly the relationship between climate, land use, soil and slope The second lesson might be devoted to recent hydro electric and irrigation schemes in the Rhone Valley, so that detail of the Languedoc and lower Rhone project would provide a further sample study However tempting it might be to include other areas, the field study was of only a small part of the Rhone Valley, aod must be kept in perspective Detail of the Alpilles and the Camargue would be of value to a sixth form studyiog France in depth A proper proportion of material amassed on field trips should be woven ioto class teaching

Although many sample studies are available, they may oeed 'tailoring' by the teacher for class use Often the material for a particular sample canoot be obtained from only one source, and it is necessary to build up information as and when it can be obtained This may mean somewhat extensive readiog on the part of the teacher, but often results in material more satisfyiog and useful for class work than any single item The corn belt farm (Fig 12) and the descriptive passage related to it is such a

composite unit. The writers regret that they could not trace the original sources and apologise for inability to acknowledge.

THE CORN FARM

When May begins the farmer starts ploughing, turning over the dark, rich soil which has been frost-bound during the winter Not until the last frost is safely past can he sow his corn in its long straight rows three feet apart In the light spring rain and warm sunshine the green cornblades soon appear, and the land between the rows is hoed

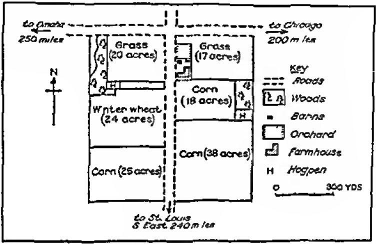


Fig 12 A Corn Belt farm in Iowa

and weeded mechanically by a 'four-row cultivator' By mid-June the plants are too tall for the cultivator to pass over them, so this work ends The farmer is then free to cut the grass fields for hay, and to harvest the ripe wheat

As the sunny days grow longer, soft summer showers, bright sunshine, and temperatures reaching 80° F or more cause rapid growth, even the warm nights seem to encourage it By August the corn towers above the farmer as he inspects the cobs swelling on plants eight to ten feet tall During the hot, autumnal September husks and stalks turn brown and the grains begin to harden, in the smallest field the plants are now cut to be stored whole for 'silage' or winter fodder The hogs, who have been busy gleaning the last stalks of wheat stubble, are now put to root joyously amongst the corn stubble before the field is ploughed and sown with winter wheat In the other fields the corn stands ripening off until October, when the mechanical picker cuts the plants and strips off the cobs, which are stored,

bushel upon bushel of glowing orange beads, in the barns Work in the fields must finish by October's end, for soon the first frosts come, and winter, when temperatures may fall ten or twenty degrees below zero and snow blankets the land, sets suddenly and relentlessly in

During the first week of November the farmer sells his fifty hogs, which have grown fat on skimmed milk, scraps and stubble He then buys thirty yearling cattle from an agent in Omaha During the long cold winter his main chore is feeding them and the four dairy cows he keeps permanently His corn grinder crushes the cobs or grinds them into meal, his chopping machine cuts up the hay and the corn stalks and leaves stored as silage On this food the young cattle wax fat in the barns as the winter months pass, and in March they are sold and taken by rail to Chicago for slaughter Then the farmer re stocks with litters of young hogs, who will finish up the winter store of corn and wander harmlessly in the wood lots while the farmer starts his May ploughing once again

An opportunity for what might be called an oral sample study is sometimes provided when there is a visitor from overseas The detail of the village of Ilishan, Nigeria,[26] was entirely the result of such an interview by one of the present writers with a Nigerian friend, Mr Onafusi These visitors, in class, are often asked to give a talk on their own country When they are geographers, such a talk is usually interesting and productive of further questions by the class In most cases, however, visitors are not trained geographers, though they have a great knowledge of fascinating detail the importance of which they are unaware of The teacher can usefully question them, *coram publico*, in the manner of the television interview In effect, he is organising for them their geographical knowledge, and extracting from them particular descriptive detail often available nowhere else The following suggestions on this particular technique are offered

The place must be located, and its distance from one known to the children established This is conveniently done by taking the visitor briefly, by questions, through his journey from the port of entry into the country concerned to his home town A blackboard sketch should be made as the details appear The teacher will presumably know sufficient of the region in general terms to know what to follow up but to do this considerable intuitive understanding, both of person and place, is required A useful opening question is to ask what would first be seen on leaving the railway station, or entering the village This may not be immediately productive of useful geographical facts, but it

places the visitor in the situation of visualising his home area and describing what is seen

The teacher should then follow up particular topics, on the lines of the enquiries and observations he would make if he were conducting a field survey himself The first essential is to set the scene for the children by questions to elicit the appearance of the countryside or townscape, with details of the houses and people as possible If new words, names of crops or trees, for example, are mentioned, they should be written on the board, and a description of their appearance obtained Facts of daily life, foodstuffs eaten or bought in the market, will often give a lead to local material for further questioning, to material, in fact, whose existence was previously unknown to the teacher Questions about clothing and housing often lead to interesting weather and climate details If the visitor is well informed on agriculture, the seasonal routine is usually illuminating on this

The teacher must sense on what subject matter the visitor is well or badly informed If he 'dries up' or is ill at ease, there must be a switch to another topic The visitor's own occupation is usually a safe field, but this may not be peculiar to the locality Places nearby which can be visited, and means of transport thereto, may offer new leads where others fail As the interview progresses, the teacher himself will realise the main subject matter to be developed in the conversation, which should normally bring out the personality of the area Much of the information can be summarised on the blackboard as the talk proceeds

This type of oral study cannot be cast into any formal pattern, nor can it often be rounded off into a complete whole Its success depends on a happy rapport between questioner and questioned, and the early discovery of an interesting and relevant theme The follow up work, when the visitor has left, is the organisation of the data, the consideration of the extent to which it is typical of the region, and the extent to which it reinforces or corrects the children's previous knowledge

The principles involved in selecting sample studies have been touched upon, but are worthy of restatement There should be abundant detail of life and landscape, which ensures accuracy of fact and the interest of the children The children should be led to discover by analysis the relationship of the activities to the geographical background, in the particular place, before any generalisations about the wider area of which it is typical are

made With this in mind, we can proceed to consider the application of method

The sample must first be accurately located Few villages or farms chosen as samples are shown on the average school atlas, and there is a valuable elementary class exercise involved in finding a location *x* miles in a given direction from a known town The basis of the work of the teacher is in the selection of detail and its presentation to the children This presentation can, and indeed should, be in a variety of ways, all familiar to the geographer, and summarised below

Maps are particularly advantageous in sample study These may be sketch maps, or, if available, the published topographical map to be studied by the children as a source of information The farm map will probably show field boundaries, the location of the farmhouse and fields, the relief, the land use, and local means of communication An example is given (Fig 13) This map is taken from Platt s *Latin America* [27] The conscientious teacher may worry lest such a study is now out-of-date Reference to Butland[28] is reassuring He states that 'The whole of the (Humid) Pampa is set in a background of pastoralism in which

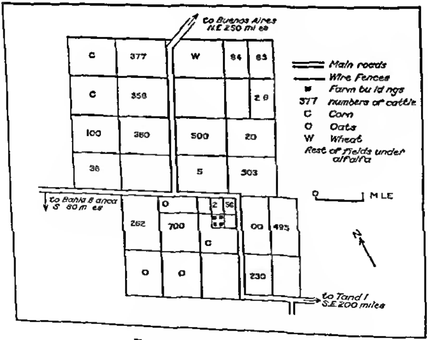


Fig 13 Estancia La Celina

little attention is paid to arable farming of a commercial kind, except in very specialised areas It is an area of rich pasture grasses, and less than twenty per cent of the land is devoted to arable farming of any kind' These vast estates are still extant, so this estancia, with its alfalfa fields and fodder crops of corn, oats and wheat, is still typical The map has been amended and slightly simplified, the roads have been given directions so that children can locate the areas as accurately as possible by means of the school atlas

The first exercise of the class must be to locate the area The following questions may then be asked

1 What do the numbers stand for? How many cattle are kept?
2 What then does estancia mean? Its chief work?
3 What do you notice about the size of the fields? Count them
4 Work out the size of the farm in square miles
5 How far does this compare in size with an English farm?
6 What shape are the fields? Are England's fields similar?
7 Why are they so even in shape? Does this, together with the shape of the roads, suggest anything about what the land is like?
8 What else does the farmer do besides keeping cattle?
9 Which is the chief grain fodder crop? What is meant by corn?
10 Why are these crops grown? (Alfalfa is inferior in midwinter cold and midsummer drought these crops give additional fodder Also alfalfa 'runs out' in about five years and needs rotation with other crops)
11 What is noticeable about the number of buildings? Why so few?
12 Why no barns? What does this suggest about climate?
13 Why is it easier for the farmer if his cattle can stay out all the year round?
14 What does lack of rivers and streams suggest?
15 How do you think water is provided for animals and farm?
16 'Water for each field is supplied by a windmill and a storage tank' (Platt) If wind pumps are used, what does this suggest about winds in this area?

The class may then mark in a possible watering place in each field, this emphasises the absence of surface water It must be remembered, too, that the actual size of the estancia and the numbers of cattle are an index of measurement in relation to other areas, not to be learnt for their own sake

The data presented should, where possible, include pictures The ideal is of pictures of the actual sample, but it is probably

better to use any pictures of a like area rather than none Thus it is possible sometimes to make use of a filmstrip, or perhaps a text book picture The pictures used should have clear geographical content, which may be made the basis of questions by the teacher Pictures of the farmer and his family, or of their social activities, may be interesting, but unless they are related directly to the environment it is not likely that they have geographical significance

If pictures are not available, a descriptive passage may serve as a replacement, it will often supplement pictures Such passages could present climatic colour and seasonal activity, from the detail of which the class may construct a year's calendar Some of the descriptions written by travellers many years ago concerned natural features which alter but little in the passage of time, so that they are still accurate Here is an example [29]

> Only when the life-giving sunshine is accompanied by the soft south wind at the earliest in the beginning of April, usually about the middle of the month, does the snow disappear quickly Even before the last snow wreaths have vanished, before the ice blocks have melted on the lakes, the bulbous plants and others put forth their leaves and raise their flower stalks to the sun Among the yellow grass and the grey stems the first green shimmers, buds are unpacked, and flowers unfold Boundless tracts are resplendent with tulips, yellow dark red, white, white and red They rise singly or in twos and threes, but they are spread over the whole steppeland, and flower at the same time, so that one sees them everywhere Immediately after the tulips come the lilies After a few weeks the steppeland lies like a gay carpet in which all tints show distinctly
>
> The animal life of the steppes also awakens Migratory birds have returned, newts and frogs, lizards and snakes, leave their winter quarters to enjoy the sunshine The spring sky is covered with cloud of all sorts, even in the finest weather with bedded clouds and wool packs which stretch over the whole dome of heaven, and around the horizon appear to touch the ground
>
> The steppes are still green when summer steals upon them, but already their full splendour is past The plants wither in the first few days of burning heat Soon the gay garment of spring is exchanged for one of grey and yellow Bright uninterrupted sunshine beats down upon the thirsty land, for now it is but rarely that the clouds gather into wool packs, and even if they are occasionally heavy with rain the downpour is scarce enough to lay the whirling dust raised by every breath of wind The songs of birds are already

hushed Creeping things such as lizards and snakes abound, and the grasshoppers swarm in hosts, forming clouds when they take the wing

Before the summer has ended the steppes have put on their autumnal garb—a variously shaded grey yellow All the brittle plants are snapped to the ground by the first storm, and the next blast scatters them in a whirling dance over the steppes They are rolled together into balls, skipping and leaping before the raging wind, half hidden in clouds of drifting dust, with which the snow laden packs in the sky seem to be running a race

A single night's frost covers the lakes with thin ice Gentle north-west winds sweep dark clouds across the sky, and the snow drizzles down in small flakes The wind changes, and blows harder and harder from the east, south east, south or south west A thin cloud sweeps over the white ground—it is formed of whirling snow, the wind becomes a tempest, the cloud rises up to heaven, and the buran (a snow hurricane) rages across the steppes

One method of using this extract is shown on page 118

It is possible to reverse the process of giving descriptions from which seasonal charts are made, by giving tables or diagrams of seasonal activities for analysis by the class, possibly with reference to climate The provision of sketches or diagrams of houses, equipment or landscape, which children may annotate to stress adaptation to climate and other elements in the landscape, offers further variety

The analysis of the material so presented forms the second stage in the lesson, and is illustrated in the examples which follow The use of a sample study should provide an opportunity for studying geographically significant detail by observation, analysis and recording To make the data available to large classes presents problems The projection of pictures should today be routine, and much printed material can be put on the screen Some descriptive passages can be read aloud to the class Much can be put on the blackboard, but for the best results simple sketches, diagrams, maps and tables should be duplicated and thus made available for individual study The building up of a repertory of sample studies in this way is not the task it might at first appear

The third stage is important, particularly for older children, since it helps in building the idea of world patterns This is the stage of generalisation Juniors and perhaps the lowest forms of secondary schools, will respond to and benefit from lessons of

this nature without further generalisation Here the sample study is used simply to extend geographical experience Above the junior level, some varying degree of expansion to the wider area should be made In general, when a typical example has been selected, it should be introduced in such a way that pupils realise at the end of the lesson that the particular conditions they have been studying are the general conditions of a wider area Sometimes this can be done directly and simply as a statement, 'Such a way of life may be found in any part of ' and a map of the region may be drawn At the highest level the class should be led to work out for itself the limiting factors, and thus to discover the regional boundaries Thus the lesson on the Norwegian farm (pages 115–118) might be followed by study of a larger area, with generalised information about the mountains, climate and agriculture, that on the steppe area (pages 118–120) would lead naturally to a map of the Steppes with detail of their present day land use The boundaries of the region represented need to be delimited carefully, with some emphasis on the transitional nature of peripheral areas

We can conclude with some assessment of this method If the material is put forward as a piece of descriptive information, exemplifying a region, without the children's analysing and discovering for themselves the geographical controls, those children will be no more inspired or educated than when presented by any other mass of geographical fact Care is needed lest sample studies be used too often We have here a useful method, but not the only method A class presented with too many sample studies will become as bored as any other class taught without variety of approach One or two per term or per continent would be ample, and even within these limits the method of presentation should vary Finally, we must beware of both failing to make appropriate generalisations, i e of failure to link the sample to the major region, or of straining too far in this respect and trying to make unjustified generalisations The sample study is a method 'of reducing parts of the world to dimensions which can be comprehended However, a geographer ought also to approach the problem from the other direction, and so adjust his standard of thinking that it matches the amount of space under consideration The result should be that, whether he studies a commune or a continent, he steers a course between superfluous detail and unwarranted generalisations'[30] For this reason, it is vital that the sample study should be typical of the region

The advantages of the method are clear It ensures that the content of the lesson is real, vivid and full of accurate detail It ensures at the same time that the children are studying geography as geographers study it, it imports field methods in the classroom It fits without difficulty into any syllabus, though it is particularly helpful to the normal regional layout It can be used at almost any level of age and ability Finally, it offers the possibility of a solution to the ever-present problem of shortage of time It is at least worth considering whether one sample, taken in one lesson, may not be as valuable as two or three more general lessons on the regions concerned Sample studies impart the principles of field work in the classroom It is to study in the field that we turn next

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YEAR ONE · SAMPLE ENVIRONMENT OVERSEAS (NORWAY)

AIM: To find out what a Norwegian fiord farm is like.

MATERIALS REQUIRED:

(i) Duplicated copies of farm sheet (Fig. 14) and paragraph below.

(ii) Atlases.

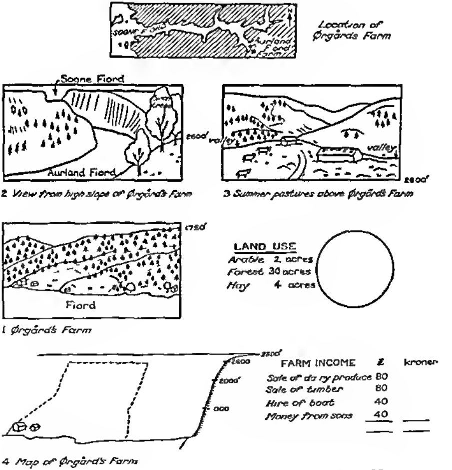

Fig 14 Farm sheet: material for sample study lesson on Norway.

METHOD

1 We are going to learn today about a farm in Norway called? (*Ørgård's Farm*) Situated? (*On Aurland Fiord*) This is a branch of another large fiord? (*Sogne Fiord*) Find Sogne Fiord on your atlas map and locate the farm

2 Look at top map What do you notice about the position of the farm? (*It is on the shore of the fiord*) Look at picture 1 This includes part of Ørgård s farm What is the water shown? (*Aurland Fiord*) Using the map and the picture, decide which coast of the fiord is shown It is? (*Eastern*) Ørgård s house is the one on the left in the picture What do you think the small building next to it is? (*Barn*) The building in the centre of the shore also belongs to Mr Ørgård What is a building so near to the sea likely to be? (*Boathouse*) On the map of Ørgard s farm, 4, print the name of the fiord in the appropriate place Write farm and barn under the correct buildings Draw the boathouse in the correct place and add a key for this

3 Look at picture 1 again What is much of the farmland covered by? (*Trees*) Type? (*Conifers*) Actually mainly spruce The picture shows the highest level up the slope to which these trees grow It is? (*1,750*) The trees don t just stop growing in a straight line—what happens to them? (*Get further apart and gradually thin out then disappear*) Following the lower edge of the forest carefully, mark in the forest on map 4 by drawing in little conifer trees [N B Upper limit of conifers is 1750]

4 What do you think land near shore without trees is? Land use column tells you (*Arable land, or land under hay*) What do you notice about this land? (*Is flatter than the rest*) Yes, is on least steep slope Let us look at the arable land first How much is there? (*Only 2 acres*) What proportion is this of the whole farm? (*1/18*) The farmer uses his arable land to grow potatoes carrots, cabbages and other vegetables for his family s use Where do you think his arable land is? (*As near as possible to the house*) On map 4 shade in an area of about 1/18 of whole farm round the house Key as arable land The rest of the lower area is cut for hay—so it is? (*Grass*) Shade in and put key for grass

5 Still have part of our map incomplete Which part? (*Above the coniferous forest*) Look at picture 2 This was drawn from the top slope of Ørgård s farm What is the height of the slope? (*2,600*) The water in the foreground is? (*Aurland Fiord*) And in distance? (*Sogne Fiord*) In which direction then was artist looking? (*N W*) What do you notice about slope on which artist stood? (*Very steep*) What about the tree types? (*Not conifers*) Are? (*Deciduous*) Are actually birch trees What does this tell you about where birch trees grow? (*Higher up*

than conifers) Yes, birches grow from the top limit of the conifers which is—? (*1,750'*) to heights of about 2,600 How much of Ørgård's farm will you need to fill in with a symbol for birch trees? (*All rest*) Do this, and put key.

6 Let us sum up the land use of the farm by completing the pie-graph The circle stands for? (*The farmland*) How much forest is there out of whole farm? ($\frac{5}{6}$) Hay? ($\frac{1}{9}$) Arable? ($\frac{1}{18}$) Put those in degrees, remembering there are 360° in the circle Will be? (*300°, 40°* and *20°*) Label the graph

7 We know what Mr Ørgård uses his arable land for? (*Vegetables*) Look at the farm income table, and can tell how he uses timber? (*Sells it*) What else does he use it for, do you think? (*Fuel, repairs, etc*) What does he use hay for? (*Cows*) How do we know? (*Sells dairy produce*) He has 2 cows and 3 goats When will he need hay for these? (*In winter*) Where will they stay then? (*In barn*) Look at picture 3 What does it show you? (*Summer pastures above farm*) At what height are these? (*2,600'*) These summer pastures do not belong to Mr Ørgård, he shares them with all the villagers He sends up 1 cow and 3 goats at the beginning of the summer Which month is that? (*May*) Do you know who looks after them? (*Young people or herder*) They are brought down again in September What happens to milk whilst cow is on summer pasture? (*Made into cheese*) Why does he keep one cow down on the farm? (*For his own milk, cheese and butter*) Can add summer pasture to map—where? (*Above birch forest*) It belongs to everyone so is called? (*Communal*) Add communal summer pasture to map

8 Mr Ørgård gets money by selling? (*Dairy produce and timber*) and also? (*From hiring his boat out*) What does he himself use a boat for? (*Fishing*) Yes, fish adds to the family's food He may also go to market or church by boat When he doesn't need it, he hires it out So from dairy produce, timber and the boat he makes? (*£200* a year) Is this much money? (*No*) The farm is small, so not much money is available What is the rest of Mr Ørgård's income from? (*His sons*) He has one daughter—what will she do? (*Help on farm*) When his 2 sons grew up the farm didn't provide enough work for them, so? (*They got jobs elsewhere*) One is a merchant seaman, one a bank clerk in Oslo They send home? (*£40 a year*) So Mr Ørgård s total income is? (*£240 a year*) You can translate this into Norwegian money 1 krone is worth 1 shilling Now complete the table

9 Conclusion There are many little farms like this one on the fiord coasts of Norway To remind you what life is like on these farms, read through the paragraph provided and then complete the blanks

Mr Ørgård's small acre farm lies alongside Fiord The agricultural land is on the less slopes alongside

the , while higher up the slope lie acres of , in which the most important trees are and Above the are summer pastures, to which Mr Ørgård sends one and three at the beginning of These pastures are the property of the villagers, and the people of the village spend the months there The farm was not large enough to support Mr Ørgård s children, so of them left One is a , and one a in Oslo

LESSON 10

YEAR THREE SAMPLE STUDY (ASIA—THE STEPPES)

AIM To find out what the Steppes are like

MATERIALS REQUIRED

(i) Map (individual copies, or on board) (Fig 15)
(ii) Description from pages 110 to 111
(iii) Atlases
(iv) Wall map of Asia (optional)
(v) Statistics for Orenburg

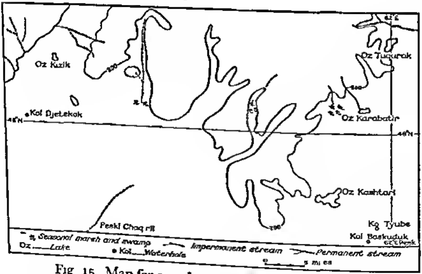

Fig 15 Map for sample study lesson on the Steppes

METHOD

1 Class locate mapped area by means of latitude and longitude lines shown (a) in atlas (b) on wall map

2 Class find area of land mapped

3 Class questioned to find out what information the map offers Board summary of features shown, to include height of land, presence of seasonal streams, permanent streams, lakes, waterholes and marsh (seasonal)—suggests limited rainfall Emphasis on fact that map shows no settlement, no roads, no railways—why?

4 Read description of area

5 Class draw circles for seasonal diagram Label months on outside Dictate temperatures for Orenburg [this station is the nearest for which figures are available], to give lengths of seasons Class write in outer circle, name seasons inside inner circle

Orenburg	J	F	M	Ap	My	J	Jy	A	S	O	N	D
Temp °F	3	6	17	38	58	66	71	67	55	39	24	11
Rainfall Ins	1 1	0 8	1 0	0 9	1 4	2 0	1 7	1 3	1 3	1 2	1 2	1 2

Class total rainfall Emphasise high evaporation in summer, winter snow

6 Class complete seasonal diagram (Fig 16)

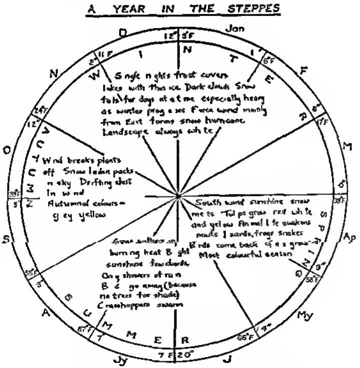

Fig 16 Child's record of lesson on the Steppes

7 Conclusion No permanent settlement because area is one of uncultivated grassland Such grassland extends over large part of U S S R and is called? (*Steppe—class find name from vegetation map in atlas*) Generalised area to be indicated on (a) atlas (b) wall map Not all steppes are uncultivated—will find out how man uses the Steppes next lesson

CHAPTER 8

FIELD WORK

THE development of field work as a major part of geographical study is probably the greatest change in the subject which has occurred in post-war years Much, if not most, research depends upon it or includes it There are few, if any, British degree courses which do not require field study in some form or other The colleges of education are, if possible, even more enthusiastic The regulations of the G C E Boards vary, but most now include reference to field study Some, particularly at A level, make it virtually compulsory 'Study of the actual examination papers of the last ten years indicates that in spirit most Examining Boards favour field work '[1] The C S E Boards are debating not so much whether, as when, to make it compulsory Many short courses in field work are offered, and there is a substantial body of published work on principles and methods

No attempt is therefore made here to produce a comprehensive manual of field work Several already exist, others are projected Yet in spite of the information available, there remains a steady demand, which is not easy to explain, by teachers for instruction in field work Those who have taken geography as a main subject at university or training college in the last ten, or even twenty, years must surely have made considerable acquaintance with it Those older have access to books and refresher courses, and in any case have acquired the habit of keeping abreast of develop ments in their subject A likely, if lamentable, explanation is that much geography is still being taught by those who have not at any time in their career studied geography as a main subject As field study is intimately bound up with good understanding of geography, it may be that these latter feel they are confronted with a new mystique of which they are not initiates This chapter will endeavour to dispel this idea It will review broadly field work in geography teaching, summarise the techniques developed, show the relationship of geography in the field to geography in the classroom and provide a guide to the literature and courses available

Field work is closely akin to exploration, and exploration is not new When primitive man sought a richer hunting ground he was concerned with the most practical type of geographic exploration Certainly man's knowledge of the world has been built up over centuries by explorers, and it was their records which formed the basis of most early geographical writings The appeal to this spirit of exploration and adventure is no small part of the motivation of field work today by children

Even in its modern forms, field work is by no means a phenomenon of recent years, and can be traced at least from the last century At a time when geography was sharply split between the physical geographers and the political, the early physiographers were conducting field investigations Clearly the geologists must go to the land for their rocks, and Huxley's great work *Physiography* is full of field examples Geikie[2] with similar leanings towards the physical, was another Victorian exponent Even closer to the modern concept of the field excursion was Mrs Gaskell, who writes, describing the early life of Charlotte Brontë 'They went long scrambling walks down mysterious shady lanes, then climbing the uplands, and thus gaining extensive views over the country, about which so much had to be told, both of its past and present history She related tales during these walks of this old house, or that new mill, and of the states of society consequent on the changes involved '

The modern period begins with Mackinder The group of geography teachers who with him built up the new geography had many ideas which are sometimes forgotten The publication they founded, *The Geographical Teacher*, has in its early numbers many suggestions for field work, some of them quite clearly the originals of modern practices Among them are 'Excursions and the teaching of geography',[3] 'An out door geographical excursion of the Manchester Municipal Secondary School'[4] and 'Field work in town schools' [5]

Further development of present day methods is to be found during the inter war years A full account of how to set about something which differs little from modern field study is Fagg and Hutchings' *Introduction to Regional Surveying*, published in 1930, but based on work which they had been doing in the twenties in Surrey It is significant of the emphasis placed upon field work that it was not until 1961 that Hutchings' work in this sphere was recognised by his election to the Presidency of the Geographical Association In the twenties, too, Fairgrieve's teaching was

emphatic and uncompromising 'Geography should be learnt through the soles of your boots' are among his most quoted words, and *Geography in School* gave full detail of how to set about what was then called a local study Olive Garnett, one of his pupils, elaborated what for many years remained the standard approach to a study of the locality in her *Fundamentals in School Geography* (Harrap, 1934) Stamp's land use survey in this period introduced thousands of schoolchildren to field work Charlotte Simpson's *Rediscovering England* (Benn, 1930) is redolent of the field approach, *The Study of Local Geography* (Methuen, 1934) shows the type of work done at the time Her book *Making Local Surveys An Eye for Country* did not appear until 1951

Miss Simpson was also an enthusiastic contributor to the work of the Le Play Society, which was essentially concerned with field studies during this period Although the society ceased to function in 1960, its contribution to the development of field work was of major importance 'Le Play's method of survey was governed by his postulate that the three fundamental determinates of society are identifiable as Place, Work and Family, of these the first, or geographical locality, presents the environmental pressures (needs) and the given possibilities (resources) which determine the nature of the work The work in turn determines the organisation of the family, which is the biological unit of human society But, conversely, the family has its inherent needs and potentialities which shape the character of the work And the work, developing in character, progressively modified the environment'[6] The broadsheets published by the society, such as those issued in 1934 and 1938, included three entitled Place, Work and Folk which were very widely used, and provided a valuable early plan for field study The present Geographical Field Group, one of the most active societies for field work, is its historical successor The Geographical Association was also encouraging the development of local studies at this time, as seen by its publication of a pamphlet under that title

In spite of these activities, which caused local studies to be written into many syllabuses, field work, both in volume and in spirit, did not 'arrive in schools before the war The precise causes of the situation outlined await detailed research In the immediate post war expansion of University departments, field work was substantially introduced The need for original geographical studies as a basis for planning was a powerful factor The Field Studies Council founded in 1943 played a fundamental

part in the training of young geographers The whole climate of educational opinion, so far as geography was concerned, seemed to favour field studies In 1947 the Ministry of Education issued Circular 140, revoking the regulation by which the consent of H M Inspectors was necessary for all secular instruction given off the school premises, and expressing the hope that L E A s would make this extended freedom a reality Educational visits were encouraged, and financial help, though never plentiful, became more readily available It may be that the strong seeds of local study, sown before the war, needed the rich ground of general post war revival in which to flourish

Precise figures of the amount of time spent by all school children today on outdoor geographical studies are unobtainable, but one suspects they would reveal that field study is still not such a fundamental part of school geography as an atlas, or even a geography room Certainly the total volume of outdoor work is great Many teachers take parties away for field work Some L E A s run their own field centres, while those of the Field Studies Council are fully booked London is packed with provincial parties, whilst the cross-channel steamers at Easter are crowded with children What percentage is this of every child s school time? 'It must be stated at once that such work is not yet universal A perusal of the inspection reports of the Ministry of Education would provide abundant evidence that in many schools it is not done at all, in still more it is done inadequately '[7] When a field work question was set in an O level paper in 1965 of 30,000 candidates some ten per cent selected it The picture at A level is more encouraging, as greater pressure is placed at this stage by the examiners At a meeting of 150 teachers in one area in 1964 to discuss the content of C S E geography a handful pressed for the inclusion of compulsory field work. The remainder were silent Again, referring to another area 'One complaint commonly voiced was that the panel had made field work compulsory '[8] We believe that today school field work is still conducted by a minority of enthusiasts, and hazard an estimate that at least half the secondary school population leaves without having made any significant contact with geographical study outside the classroom

It will illuminate the post war approach to field studies if we consider the attitudes current in the inter war period The advocates of local studies stressed the fact that geography was available on the school doorstep—an admirable principle—and

in their enthusiasm demonstrated it rather than led the children to find it for themselves At a time when text books gave in the main accounts of other countries remote from children's experience, this was all to the good Children were taken into the country and shown carefully how the landscape could be correlated with the geological map The end of this is not yet Even Fairgrieve took his students on an urban walk which showed them, but did not invite them to discover, office groupings in Holborn, the valley of the Fleet, and the hill on which the City of London stood The following notes, distributed to a class in Perthshire in 1933, are indicative of the period 'Proceed down gentle slope from school towards river Off plateau of volcanic rock to river alluvium Note third and second terraces Flood plain of River Earn is ½–¾ mile wide Bluffs clearly seen at side sharp rise of 15–20 feet Floor of flood plain rich alluvium *Usually rough pasture, some ploughland Note several lakes in* old river bed Line of debris indicates last flood level Note all dwellings off flood plain' It will be an exercise for the student of today to cast this material into question form, couched in terms that the children discover it for themselves without being specifically told

This approach is not to be wholly discarded It is better that children should see for themselves chalk scrubland, a factory location, or a raised beach than study it in class, however well illustrated Real examples seen in the field enrich geographical experience, and the explanatory lecture on the spot has its place All who have shivered on British hillsides during such lectures know full well how they should be kept in proportion

The persistence of the expository attitude may explain why some are reluctant to undertake field work in new areas, and the demand for led excursions 'I must learn the geography of X, before I take the children there' 'If I go on excursion Y, there is another field day I have learnt' We are not without sympathy for such sentiments It would be the negation of academic study to suggest that the teacher should know nothing about the proposed area But this knowledge is, in the main, not for onward transmission to the pupils It is to guide the teacher towards finding useful exercises for the children and significant material for them to discover Much of the emphasis upon geographical training today is concerned with techniques of study, and perhaps the most important of these is that of making a study of a given area in the field With some diffidence, therefore, we offer

first the following general guidance for the amateur on geographical field work today

Geography has been said to be a point of view Similarly field work might be called an attitude of mind There is nothing mysterious about it at school level It is a study of the landscape on the spot The children are going exploring The teacher is their guide and mentor rather than their instructor They should set out to observe, analyse, and, as far as possible, explain the landscape Briault has called it 'accurate observation accurately recorded' In its complete form, a full geographical study of the area may result, but this is by no means essential Indeed, most school excursions will rather be directed to some particular topic well exemplified in the area

The field study attitude is a spirit of enquiry One must see the landscape with a fresh eye For this reason it is sometimes easier for the beginner to do early field work in a new area, not previously visited The old familiar landmarks of a district well known do not strike the attention It is also not easy to distinguish between facts which are observable on the ground, and information which, though relevant, is a product of other studies In the long run clearly the teacher who knows an area well will be better fitted to conduct field studies in it, but the greater his knowledge the more must he guard against mere telling

The ability to observe and analyse a landscape has been called having 'an eye for country' This ability is inextricably intermingled with general geographical training, and the experienced geographer may find the ensuing paragraphs elementary Those who have not this art can help themselves to it indoors by picture study The analysis of a landscape picture (page 75) is closely similar to the work carried out from a good viewpoint The easiest for the beginner is one which covers not too vast a scene, and which presents some simple contrasts England, with its variety of scenery, is rich in such opportunities

The scene should first be broken down into major components, and relief or landforms will probably be the basis of this At a later stage, attention to detail of the minor landforms should not be forgotten Against this physical background the vegetational or agricultural pattern can be placed, and relationships between the two sought The remainder of the human geography of settlements, routes and other visible evidence of man's activities, completes the elementary analysis

This is a crude summary, and what is a complicated skill is

not readily broken down into a formula A list of types of material to be observed would fall into the orthodox headings of the regional account, and though useful as a framework, might, if slavishly followed, destroy the unity of the study In any case, the view of the landscape, though a convenient starting point, is not the whole of field geography The basic principle for the beginner, from his static viewpoint or as he walks along, is to look at the landscape with an enquiring eye, first to note the facts which give it its personality, second to record them, third to perceive the patterns they form, fourth to see their relationships and lastly, as far as possible, to explain them

Kipling's elephant might also be remembered The field worker must develop the habit of 'insatiable curiosity' The main road is but the façade of the district In rural areas the footpath and the by lane must be explored Most quarries merit examination, and at least the occasional farmyard The conversation started while leaning on style or gate is often informative of further local material In towns the side alleys and back streets are more typical than the standardised shop fronts of the chain stores Half an-hour's watching from an unobtrusive corner of the market square will give the newcomer a 'feel' of the town which is forever denied to the inhabitant

What has so far been said about field work has been intro ductory, and we now review the full implications of such work This review falls conveniently into the why, when, where and how of field study, and it is under these sub headings that our analysis continues

Why should there be Field Work?

There is a case to be made for field studies for their own sake Is it not a good thing in itself that children should be able to understand a landscape? Are they not better citizens if they are trained to observe and appreciate the land they live in? Are they not better educated if they can see a little more in the countryside than trees, hedges, houses and factories? We believe that training in field work offers children a deeper understanding of their cultural heritage and opportunity to obtain later richer experiences during their leisure This is particularly so in the modern world when travel has become commonplace

At a simpler level, field work offers occasions for healthy outdoor work, and gives town children very necessary knowledge of the country In this it plays a part along with the whole open

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At a simpler level, field work offers occasions for healthy outdoor work, and gives town children very necessary knowledge of the country In this it plays a part along with the whole open

air movement Baden Powell with his Scouting, and the German *Wandervogel*, were early in this century forerunners who saw the value of this The Duke of Edinburgh's Award Scheme encourages the same values The Youth Hostels' Association works towards similar ends, and offers excellent opportunities Some of its hostels give special facilities to field study parties [9] Any teacher who takes a class for an explanatory walk, preferably in the country, is in a way carrying out field work, though he may not dignify it with such an elaborate title—nor need he

The main argument for the inclusion of some field work in the school syllabus is that it nowadays is an integral part of the subject Much if not most of the raw material of geography is the surface of the land Geographies are written records of original field investigations We have already stated the case for studying geography in school If there is any virtue in the study of the subject, part of this is lost if the children do not themselves carry out some of its fundamental processes The adult geographer investigates the land, and part of the appreciation of the subject by children will depend upon their making for themselves such an investigation

A minor, but related, argument concerns the learning of map reading and other mapping skills Map work is considered in chapter 4, but an essential cross reference must be made here A great deal of field work is recorded on maps, and there must be few moments when children are not working with some form of map in their hands Almost the whole of their field work is developing and strengthening their map reading ability As early as possible in their school life, children should be given an opportunity of relating map to ground Such a lesson is often their first experience of outdoor geography This is only developing a skill, unless some additional purpose is added, it is not field work in the sense we have been elaborating

Field work also plays a great part in making geography real for children The importance of reality in geography teaching is stressed throughout this book, and a variety of ways of ensuring it suggested Seeing real geography in the field is probably the most important method of all

The simplest case is the observation of the factual example, which has probably been already considered in class Ideally the field observation should come first, but this is clearly impracticable in most cases For instance, take vegetation Even the best

pictures and botanical specimens cannot convey the vivid and lasting impression of, say, a walk over Pennine moorland or through the prickly, aromatic garrigue with its thyme, rosemary, lavender and kermes oak. Observation of landforms is also in this category, and will be further considered in chapter 12. Again the picture is a substitute, if only because the field example can be seen in its widest setting, beyond the angle of the camera lens. Considerable training is needed in this case, and children must be offered a series of examples graduated in difficulty. They can see plants, though they may not be able to name them, without further instruction. A scarp face, a valley form, or a river terrace cannot be seen until the attention is directed to it. The teacher's eye for country has already been mentioned. He must

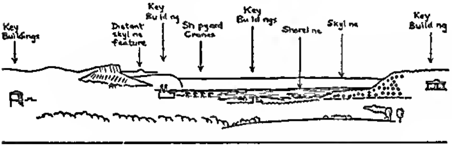

Fig. 17. Prepared field sketch (Belfast) to assist class study from a viewpoint.

also cultivate a number of ways of aligning the children's sight exactly to the feature concerned (Fig. 17). The section later on techniques will assist him.

A repertoire of factual information is only part of the school child's geography. Indeed, unless geography is to be a sterile collection of facts it must not be an overloaded proportion. Relationships are the more advanced form of field observations, and it has been implied that children should discover these for themselves. This can follow from ordinary class questioning in the field during, say, a halt on an excursion. One must be careful not to go too far in terms of explanation. Historical and economic factors in particular are often not observable, and explanations in terms only of what can be seen could well be invalid. In most cases in the field facts rather than processes are to be seen. Explanations may arise as wider patterns emerge. The simple matching of marshland with a valley floor, or villages with a line of springs are observable factual relationships more vivid

than when presented by maps in class But they must be noted as observed relationships only, offering partial explanations To go further is to encourage determinism

A similar, but perhaps slightly different way of looking at these points is to suggest that field work can be used to show pupils how geography gets into the text book Children seldom query their geography texts until the sixth form Why should they? The text book tells them the facts, and unless they have been trained in scepticism they accept them Pictures were taken by photographers, statistics were gathered from official sources, verbal descriptions were written by travellers But how were maps drawn? And who decided that the particular account printed was the appropriate description of a given area? After a field excursion, or after some study of the home district, it is a salutary exercise for a class to write their own geographical summary of the area, and to compare it with the appropriate paragraph in a text book at their own level If their work has been good, and the book is sound, their comments will reflect delight at their discoveries

A process opposite to the above is sometimes followed, but this 'inverted geography' should be treated with some care The academic geographer enjoys seeing his subject on the ground, as he has studied it Children can be equally interested 'This place is just as I expected it to be' from a pupil is a tribute to good teaching Sixth formers and older students gain a great deal by seeing, particularly on journeys, the areas they have studied, and we do not deny the value of this, in moderation The basic approach of the teacher, however, should be as far as possible from the field to the classroom 'This is the reality we shall learn more about it in school' rather than 'We have learnt about this now let us go and see it'

We have already made briefly the general point that children should themselves carry out some field study as an integral part of geography For older children, and particularly sixth formers, a complete field study of an area introduces them to the higher levels, indeed to the very core of the subject, in addition to showing them the geographers' techniques Wooldridge put this aspect strongly 'The road to the attainment of both our objectives, the improvement of our status as a subject and our teaching of it, lies in the development of the laboratory spirit and the careful, indeed minute study of limited areas . The difficult piece of integration which geography attempts must be vindi-

cated on (the) ground '[10] By such studies pupils are made aware of essential aspects of geography's subject discipline, of discovering the facts about a place, of synthesising them, and endeavouring to explain them

There is contributory evidence to the worthwhileness of field work in two post war researches Oliver[11] and Ware[12] both investigated the relationship of field work to geographical studies, and found similar results Oliver's test population were training college students, and Ware's third form grammar school boys Both used control groups which were pursuing a similar course of studies without field work Oliver's excursion programmes were designed to promote the understanding of geographic concepts and principles and not merely to increase knowledge of the districts visited The results of his tests show that the effect of outdoor work in geography upon attitude is more immediate than that on attainment The effect of observational work on the youngest students was most noticeable Ware, too, found no great improvement in academic performance, except in map work, but considerable improvement in attitude The boys who were least favourably inclined towards geography at the outset derived most benefit from the excursions as far as attitude was concerned The average boys made most advance in attainment That field work improves the attitude of the average child towards the subject study is further evidenced in the biological field research of Pheasant [13] In these days, when the motivation of learning through emotional appeal is sought, a favourable attitude is seen to be the first requisite of learning

When should Field Work be undertaken?

It is when the actual planning of the field work programme is considered that the practical difficulties arise When can field work be carried out? The possibilities are the local lesson, done in one period without timetable adjustment, the double period or afternoon excursion, done with a minimum of adjustment, the whole day excursion, the organised field course of a week or more If the work is to be a real part of the school geography course, closely integrated with it, it should be done throughout the child s school life, and be as much a part of the programme as the normal syllabus layout The following very modest pro gramme is suggested which allows for steady development of field ability, so that full advantage is taken of the longer periods of work

than when presented by maps in class But they must be noted as observed relationships only, offering partial explanations To go further is to encourage determinism

A similar, but perhaps slightly different way of looking at these points is to suggest that *field work can be used to show* pupils how geography gets into the text book Children seldom query their geography texts until the sixth form Why should they? The text book tells them the facts, and unless they have been trained in scepticism they accept them Pictures were taken by photographers, statistics were gathered from official sources, verbal descriptions were written by travellers But how were maps drawn? And who decided that the particular account printed was the appropriate description of a given area? After a field excursion, or after some study of the home district, it is a salutary exercise for a class to write their own geographical summary of the area, and to compare it with the appropriate paragraph in a text book at their own level If their work has been good, and the book is sound, their comments will reflect delight at their discoveries

A process opposite to the above is sometimes followed, but this 'inverted geography should be treated with some care The academic geographer enjoys seeing his subject on the ground, as he has studied it. Children can be equally interested 'This place is just as I expected it to be' from a pupil is a tribute to good teaching Sixth formers and older students gain a great deal by seeing, particularly on journeys, the areas they have studied, and we do not deny the value of this, in moderation The basic approach of the teacher, however, should be as far as possible from the field to the classroom 'This is the reality we shall learn more about it in school' rather than 'We have learnt about this now let us go and see it'

We have already made briefly the general point that children should themselves carry out some field study as an integral part of geography For older children, and particularly sixth-formers, a complete field study of an area introduces them to the higher levels, indeed to the very core of the subject, in addition to showing them the geographers' techniques Wooldridge put this aspect strongly 'The road to the attainment of both our objectives, the improvement of our status as a subject and our teaching of it, lies in the development of the laboratory spirit and the careful, indeed minute study of limited areas . . The difficult piece of integration which geography attempts must be vindi-

cated on (the) ground '[10] By such studies pupils are made aware of essential aspects of geography's subject discipline, of discovering the facts about a place, of synthesising them, and endeavouring to explain them

There is contributory evidence to the worthwhileness of field work in two post war researches Oliver[11] and Ware[12] both investigated the relationship of field work to geographical studies, and found similar results Oliver's test population were training college students, and Ware's third form grammar school boys Both used control groups which were pursuing a similar course of studies without field work Oliver's excursion programmes were designed to promote the understanding of geographic concepts and principles and not merely to increase knowledge of the districts visited The results of his tests show that the effect of outdoor work in geography upon attitude is more immediate than that on attainment The effect of observational work on the youngest students was most noticeable Ware, too, found no great improvement in academic performance, except in map work, but considerable improvement in attitude The boys who were least favourably inclined towards geography at the outset derived most benefit from the excursions as far as attitude was concerned The average boys made most advance in attainment That field work improves the attitude of the average child towards the subject study is further evidenced in the biological field research of Pheasant [13] In these days, when the motivation of learning through emotional appeal is sought, a favourable attitude is seen to be the first requisite of learning

WHEN SHOULD FIELD WORK BE UNDERTAKEN?

It is when the actual planning of the field work programme is considered that the practical difficulties arise When can field work be carried out? The possibilities are the local lesson, done in one period without timetable adjustment, the double period or afternoon excursion, done with a minimum of adjustment, the whole day excursion, the organised field course of a week or more If the work is to be a real part of the school geography course, closely integrated with it, it should be done throughout the child s school life, and be as much a part of the programme as the normal syllabus layout The following very modest pro gramme is suggested which allows for steady development of field ability, so that full advantage is taken of the longer periods of work

FIELD WORK PROGRAMME

Year 1	Local lessons plus 1 half day
2	Local lessons plus 1 half day
3	Local lessons plus 1 whole day
4	1 whole day
5	1 or 2 whole days
6	Field course of 7 days or more,
6	plus single days

Examination of the practical difficulties involved immediately explains why this situation does not at present exist It means that, not including sixth form work, for a minimum of three or four days in the school year (assuming that staffing and other considerations permit each year group to go on the same day) the school s timetable for that year group is devoted to one subject We need hardly labour the point The geography teacher in addition to the considerable organisational work has to persuade the head and colleagues that the work is justified Attitudes are changed where a joint excursion, e g with biologists, can be planned, but subject options do not often permit this A few teachers have built up such a programme For sixth forms, where timetables are more flexible and internal exchanges of periods are possible, circumstances are easier The situation is particularly difficult during the fourth and fifth years in schools with a subject programme aimed substantially at a public examination If field work is made compulsory in the C S E it will revolutionise the subject—and possibly decimate the number of entries in the early years

In practice much if not most of the field work developed in schools since the war has been done on a voluntary basis during out-of school time School field work societies, Saturday single day or week end excursions and field courses in the holidays have been until recently the main occasions when children have done field work Many teachers have for years devoted a sub stantial part of their vacation to leading large school parties on carefully organised field excursions The main exception is the attendance, *en masse* or as individuals, of sixth formers at field study centres or of school parties at the steadily growing number of school camps, established by Local Education Authorities, where much field work is done The professional problem of

this extra call on time is one we do not propose to discuss It seems likely that no great increase in field work will occur until provision can be made for it within the schools' working time Within the timetable, at present most work is done with the lower forms and upper school specialists, with spasmodic single excursions in the middle years

WHERE FIELD WORK CAN BE DONE

The question of time controls that of location Local lessons must be within walking distance of the school, and half day ones little further Day excursions, by private coach or public transport, must be limited in travel time if much work is to be done on the ground They will therefore be within the school region The selection of a field study area for a prolonged stay offers a vast range of choice, and will be considered later

It is with the practical difficulties in mind that we stress the study of the school's immediate locality, and clearly the opportunities offered vary enormously from school to school Situations in large villages or small towns, offering urban and rural material are perhaps the ideal The majority, however, are in urban areas The expression 'field work' is suggestive still to many of rural study, and conscious effort must be made to discover the possibilities of local work in towns The most urgent need of a teacher who wishes to develop this side of geography is to examine in detail the area within half a mile or so of his school, so that some half-dozen lessons or short excursions can be devised, covering a variety of subjects of graded difficulty These can form a programme possible with little or no timetable alteration, for the first three years

With the wider range of choice provided by transport and time, locations for whole day excursions present little problems Previous local training is important routine skills of map reading and map recording, field sketching and the beginnings of an eye for country should have been developed near the school and in class, thus enabling the children to profit to the full from the major excursion As most schools are in an urban environment, teachers will normally visit a country area, and a sound purpose for a first day excursion is an introduction to country lore A specific farm visit forms a useful major objective for such a day, and introduction to the country code of shutting gates and avoiding growing crops not the least item of education Work should also be done on the journey, particularly when this is, as so often, by

private coach Its most elementary form is the relating of the route to the map, prepared for this purpose by the teacher Suggestions for more elaborate work are given later (page 147)

Other full day excursions, for children fourteen years or so and above, can well be directed to specific studies The main criteria, that they should show relationships, and offer material which illuminates classroom study, have been indicated Visits to two contrasting landscapes are useful, a morning on chalk or limestone, and an afternoon on clay is an example A walk across a series of outcrops, using the transect method, is a development Striking physical phenomena—coastal scenery or glaciated valleys—form good items if within reach For country children an excursion to an industrialised area, with visits to docks or coal mine, is a less healthy but necessary contrast

One new development is the excursion by air All geographers who have flown know the remarkable impression made by the first view of the land from the air In one case the principle powerfully revealed was the nodality of agricultural settlements in Central Belgium, with a dozen or so white farm tracks and footpaths radiating from the centre In another the pattern of cultivated land eating into a moorland was particularly vivid A handful of enterprising teachers have organised local flights mainly as geographical field trips There are now short courses under consideration to further the idea The main difficulty is, of course, cost, but another is the fact that near urban agglomerations—and that is where most children live—airports and aircraft are large, and small local flights cannot always be arranged in the increasingly congested air space There will be a great temptation to see too much A circular or triangular trip made over a modest area two or three times will be of greater value than a single trip over a vaster one

How Field Work is done a Review of Techniques

Much has already been implied of how to conduct field work, and a guide to further reading is given later, but a summary of methods and techniques may here be useful In essence there are two possible situations, the conducted field excursion, where the teacher has the whole class together for what might be called normal open air teaching, and independent work, by individuals or groups, where children are dispersed over a certain area with tasks to perform The led excursion, with a route map, questions to answer, material to record, and organised stopping places

for class questioning and discussion, is a basic technique The age at which individual or small group work can be attempted varies considerably In conditions of safety, e g a public park, with a clearly defined area, quite young children can disperse with given tasks under the eye of the teacher A minimum age of fourteen or fifteen would be required by most teachers before really independent work can be attempted Matters of principle are here involved, not the least of which is the responsibility of the teacher Advanced field work undoubtedly requires the dispersal of the pupils on set tasks, beyond the immediate control of the teacher, and as a result it is in the main limited to fifth and sixth form work Whatever method is in use, forms of recording must be adopted Many of those which follow can be used by the whole class at one time and place Others are only appropriate to regional survey by individuals or small groups

The map is the basic form of recording, and the provision of one usually the essential preparation needed The published large scale map, though it should be available, is of limited use in this respect, and some form of expendable prepared blank is necessary A simplified route map can often give guidance and opportunity for writing For detailed recording of facts over a small area studied, e g a village or farm, the provision of an outline map with boundaries often presents difficulties The teacher must acquire the art of devising a simple base map, from whatever detailed maps are available, and should free himself from the limitations of meticulous accuracy (Fig 18) The facts to be recorded are well known Land use, both urban and rural, is matter which first presents itself to the eye Historical and economic material is also visible The approach to physical geography will begin with the recording of drainage and height, and develop with age and experience to the recording of more subtle features

Much can be done with freehand maps drawn by children, judged by eye or supplemented by pacing Fig 19 is an example The diagram drawn on the spot of farm yard or river wharf is adequate for most work The elementary features of a small river bed, showing steep or gentle banks, pebble beds exposed, deposited silt, and so on are easily recorded thus

Various forms of section, prepared in advance or drawn on the spot, are suitable in particular circumstances Of prepared sections the transect, developed particularly by the late Geoffrey Hutchings at Juniper Hall Field Centre, is the best known It is

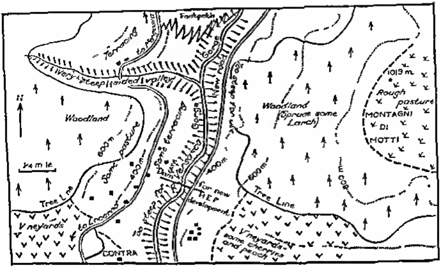

Fig. 18. Completed base map (Val Verzasca, near Contra). (Original blank supplied had contours and main road only.)

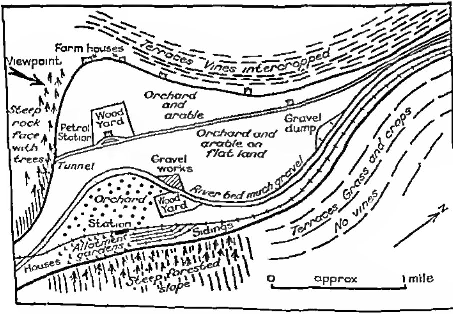

Fig 19 Land use map near Klausen, S. Tirol: sketched freehand from a viewpoint.

mainly used for a record of a cross country journey, and consists of a specially prepared map, covering the area traversed and extending some few hundred yards on each side of the route Six inches to the mile is the most suitable scale Again, this form of record can be done without previous preparation The line diagram, with notes of features on each side of the road, in the manner of a surveyor's notebook of a compass traverse, is efficient and convenient A prepared pro forma of a journey, with sections above and divisions below for different types of matter, is a well known variant For urban work, the prepared street profile, with divisions below, can be useful (Fig 20)

Many other sections can be measured or drawn The soil section, from an exposure or by soil-auger, is the most obvious

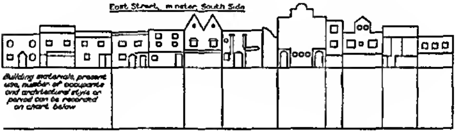

Fig 20 Prepared street profile Ilminster, Somerset

Cliff and other geological exposures on steep faces are readily drawn Beach sections can be drawn by pacing assisted by various forms of simple levelling Briault and Shave's method of mapping a river valley with a home-made level should be noted [14]

Perhaps the main form of field recording which has developed in the recent past is the field sketch, and children should be trained in this technique In essence it is the drawing of a land scape with notes of salient geographical features Field sketches have for long been used for military purposes, and useful technical instruction can be found in Army manuals The chief difficulty children encounter is the proportion of width to depth The view seen is usually many times wider than it is deep Various devices can be used here Strict limits of distance to right and left of a centre line should be taken, and measuring proportion of depth to width by a pencil held at arm's length is helpful A rectangle of wire, or a rectangle cut in a piece of paper, again held at arm's length, are other aids Training indoors, by preparation of a field sketch from a landscape photo, even by tracing

off main features, is helpful. Selected lines on the landscape, often, but not always, relief features, are the starting points. Upon this framework whatever material presents itself may be recorded. An 'empty' line diagram, prepared beforehand from a photograph, is a valuable device for introducing children to the study of a landscape (Figs. 8 and 21). The urban profile is a form of field sketch, and a valuable introduction to the study of townscapes.

There are many simpler variants of the field sketch all of which are more efficient—and more attractive to children—than

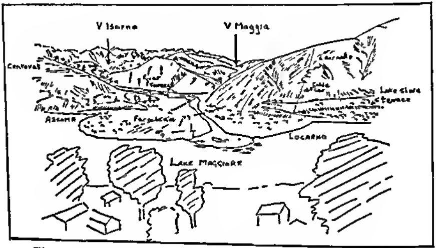

Fig 21. Field sketch of Locarno area from Gerra (completed version of empty line diagram).

written notes. A sketch or diagram of a house, particularly to show building materials, is an example. The picture or pictorial diagram also usefully records plants and vegetation. The field-sketch-cum-diagram is appropriate for middle-distance and close-up material, such as a waterfall, a natural arch, or the snout of a glacier.

This list is by no means exhaustive, and many teachers have devised their own particular methods. The prepared questionnaire is popular and well known. For the sake of completeness we mention other equipment. The field notebook—small and with a hard cover—is essential. A piece of hardboard with a spring-clip is useful for holding maps. The soil-auger can sometimes reach bedrock as well as the soil. Simple levels or a sight clinometer can be used with caution. The permanent record of

the camera is now within reach of most students, and later study of pictures will often remind them of detail not noted at the time, or forgotten

Preparation by the teacher for field excursions involves more work than usual The routine aspects of this are obvious and have been indicated Chief among them is the provision of maps and other means of recording The principles of selection of area have been touched on The real core of the teacher's preparation is his reconnaisance on the ground For local excursions this is possible, though at present it is normally undertaken in his 'spare' time, for work at distant centres visited for the first time he must almost certainly prepare from the map only, and make local adjustments on the spot His reconnaisance has several purposes Some preliminary reading will have given the setting of the area, and indicate the geographic detail likely to be available Clearly the teacher will check the proposed route, and study the material available We suggest that the most important purpose is to devise ways in which the class is to observe and record field detail He is looking not so much for the answers, but for the questions In each area or at each stopping point, therefore, he should say to himself 'What can be seen from here?', 'How shall I direct the children to discover it?' and 'How can they record it?' Much of this chapter is intended to help the young teacher to develop these skills

Early shorter excursions are preliminary training for a longer stay at a field centre, and some consideration of the overall planning needed is now given First find your centre There are an increasing number of residential centres being established in this country by Local Education Authorities The School Journeys Association of London offers a list of possible accom modation The field study centres of the Field Studies Council are best known and most heavily booked Youth Hostels have been mentioned Various other organisations maintain hostels and guest houses which are available for party booking, particularly outside the main holiday season In general the hostel, which usually has a room available for working sessions, is preferable to the hotel

The choice of area is often controlled by the availability of accommodation, but usually the type of hostel listed above is situated in interesting country Where a choice is possible, the criterion should be the richness and variety of countryside The more concentrated the items of study available, the better A

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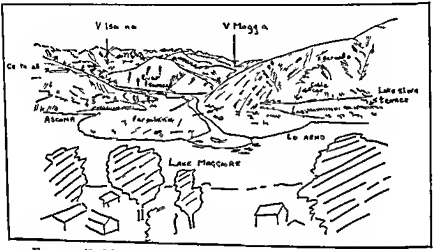

Fig 21 Field sketch of Locarno area from Gerra (completed version of empty line diagram)

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large area of homogenous countryside is less profitable than one with many local variations Access to a local communication centre is important to help access to other areas The selection and planning of such a field stay is an exercise in applied geography that most teachers enjoy

Finance is a problem, and the assistance given by local authorities varies greatly, as do their regulations for the conduct of school parties[15] The intending teacher should get from his local authority the necessary detail He is usually also covered by them against the risks of claims by parents Safety might be mentioned here The legal responsibility of the teacher is a special subject, but membership of most professional associations gives cover In any case, it is common sense that the leader should take every possible precaution Careful warnings must be given when visiting factory or mine Field work is not rock-climbing, and though most adolescents enjoy rough going, only completely safe hill walking should be attempted Field work must not be marred by tragedy

The planning of a programme of residential field work for older pupils involves certain general principles, these we suggest to be as follows First there should be balance between teacher-conducted excursions and group work days when pupils have set tasks under their own leaders Secondly, there should be balance between a fairly detailed study of the immediate area (that within walking distance), and a broader view of the wider environment Thirdly all aspects of the geography of the region should be considered In addition to general purpose walking excursions, there should be opportunity for specialist studies of agriculture, settlement, physical features and the like This includes visits to any special items locally available—mine, hydro electricity scheme, limestone caves, docks Fourthly, if funds permit, one fairly long coach trip, towards the end of the period, should be used to put the locality studied in its regional setting The ideal programme offers variety and ample scope for individual work

As an example of the application of these ideas, the following programme is given, based on Locarno, on Lake Maggiore It has been polished and pruned by several years' experience, but the original layout was planned from the map It can be followed on Sheet 276, Val Verzasca, of the Swiss 1 50,000 series

Day 1 Arrive in morning After lunch, walk to Madonna del Sasso (viewpoint) for review of town and whole area

Day 2	Walk to Mergoscia General study of upper lakeside area, a subsidiary valley and a village (Fig 18)
Day 3	Walk to Ronco Reviews town expansion, the delta of the river Maggia, lake-shore developments, and includes visit to hydro-electric power station Return by boat
Day 4	Group work Each group visits a nearby village, including study of a farm
Day 5	Train to Lugano Morning visit to viewpoint, with afternoon free for shopping
Day 6	Short train journey to Intragna Journey reviews valley of the Melezza Walk to Loco, examining another subsidiary valley and village Vegetation studies on return
Day 7	Coach trip to the plain of Lombardy Group studies of a different type of village and agriculture
Day 8	Group work on special topics the delta of the Maggia, the terraces of the Melezza (Fig 42), the Piano de Magadino, and sample urban surveys of Locarno
Day 9	Boat across lake to Vira Walk to Gerra and return by boat (Fig 21)
Day 10	Can be free in Locarno, or by break of journey visit another town *en route* home

This ten day working programme makes no allowance for bad weather or Sunday If one further day is available, the second group work day can be repeated, changing groups round On all days organised work for the pupils is assumed, as with the one day excursions already considered The programme further does not mention three or four evening meetings to review the day's work, including a final conference to assess what has been learnt of the geography of the area

Comment on this programme layout may be helpful Some form of review of the area must come on the first day If no viewpoint is available, a short exploratory walk is the obvious replacement The next two days, one eastwards, one westwards, give general introduction to the whole district, and are teacher-directed while the pupils are finding their bearings Indications of what will be studied later can be given, and topics of particular interest for different children will begin to appear By the fourth day they will be ready for independent study, and the village day provides this Leaders must be appointed and a full programme of work given The next day is mainly a holiday, so the journey, which is interesting and offers views of a different

type of valley can be used intensively A shopping day also removes the amount of interruptions caused on this account elsewhere The next day explores another area, this time northwards As the walking is heavy, the following coach trip gives a rest and a different form of study The contrasts in the plain of Lombardy are, of course, striking The second group study day is another change in style Particular interests can here be given scope, and the material available for study covers land use, urban survey, soils, and some very interesting landforms, which are well within the understanding of sixth formers (Fig 42) The last day completes the boxing of the compass, visits the other side of the lake, and is a useful final day, as during the walking the whole of the main area is seen from a new angle (Fig 21)

We have thus far considered field work in terms mainly of separate specific items of work for whole classes or groups, as the form of work most teachers will find practicable A regional survey of a given small area is important in field work, and in certain circumstances, the work done by groups of children can be fitted together afterwards in the classroom to produce a complete regional study Indeed, whenever possible, this should be done A regional survey as such, however, is a task for mature minds, and is not likely to be attempted by other than sixth-formers working largely as individuals, or in closely co-ordinated co operative studies Detailed schemes for such regional studies have been published in other works The following simple plans are now offered largely to emphasise the importance of the complete study and the opportunity it presents of making some form of synthesis The plans are aimed at sixth form level, but some of the ideas can be adapted for lower levels A simplified farm study could particularly be used to introduce younger children to their first complete study of a given area

(b) Stock Numbers, types, use fodder, markets	Map to show where stock are sent to market. Isotype diagram to show stock
4. *The Buildings*	
Plan of farm buildings	Draw large plan with notes
Materials used, capacity and purpose	Sketch of a building to sbow materials
Mechanical equipment	List or sketch/diagram
Cottages Labour supply	
5 *Weather*	
Some information about local climate Winter difficulties Summer difficulties Waterlogged fields? Fields which dry out? Cattle in winter? Do any fields offer an 'early bite'?	Seasonal diagram entitled 'The farmer's year'

PARISH STUDY

MATERIAL	RECORD
1 *Go and look*	
(a) Shape, reasons for this Compare with shape of neighbouring parishes Examine boundary on map Are there any peculiarities which can be explained?	Sketch of boundary with comments
(b) Relief high, low ground Steep slopes At end of study, can you divide parish into geographical regions, or is parish similar in all parts?	If so, map to show this

(c) Drainage Amount and size of surface streams Is area adequately drained? Any marsh or swamp?	Record on map
The People	
(a) Census of occupied houses gives population estimate	Map Occupied and derelict houses Calculate area, then population density
(b) What evidence is there of occupations in the parish?	Graph or diagram
3 *The Village*	
(a) Examine the facts	Plan of village, with details of all buildings—farms, private houses, school, church Mark new and old houses
(b) What is missing, compared with average village? Why? Where and how far must people go for missing services?	Map to locate other services
(c) Examine water supply locate springs, wells	Sketch or map of village water supply
(d) Why is it just here?	Section with notes
(e) Historical items Dates of buildings Public monuments	Map to locate oldest buildings
4 *Sections across the Area*	
(a) Use of the land	Annotated section notes on the countryside and land use
(b) Types of road (e g main, farm track)	
(c) Field boundaries	Field sketches, e g dry stone walls

5 *The Use of the Land* Where time does not permit more, a small section of the parish which appears to be representative can be used Are there different parts of the parish which present contrasts in land use? (Short classification Arable (with crops) rotation grass, permanent grass, heathland, forest, houses with gardens, unproductive land)	Land use map

SMALL TOWN STUDY

1 *Site A General Investigation*

(a) Look at town from viewpoints outside it, if possible Field sketch of site Viewpoint within, e g church tower or roof of highest building

(b) Consider site in relation to relief why is it not higher? lower? Section will help here

(c) Locate the oldest part of the town and consider the original site

(d) Consider water supply

(e) Consider original routes which crossed here

2 *History, Houses, Architecture*

(a) Locate and map the oldest buildings (town centre) Possible map The historical development of '

(b) Observe street names and plans Any sign of congestion, need for by pass, etc Is this possible?

(c) Sketches of architectural features of various periods, e.g churches, old pubs, town hall

(d) A profile record of suitable street, to show historical changes

(e) Ditto to show material of buildings and present use

(f) For historians examine and follow up history from main ancient buildings, e g church, grammar school, vicarage, town hall

3 *Development*

Select a small appropriate area as a sample, and sketch in all changes, most towns have a new housing estate somewhere

If time permits, for whole town, locate post-1945 buildings, to produce map to show post war development

4 *Routes and Communications*

Collect raw material for map entitled 'Public communications with '

Is railway station near town centre? Are 'bus services better than trains?

Recent changes?

5 *Industry*

Locate main industries Mark on map to produce summary of information In each case (or for selected industries, according to time) (a) sketch map of site, (b) history of building or site, (c) source of raw materials, (d) distribution of product

6 *Other Functions of the Town*

(a) Where are the shops? Map in detail, according to time avail- available Any *used* market place? What types of shops are missing? For specific location (mark on map) petrol stations, large hotels, other public houses Can you draw any conclusions from these locations?

(b) Other services, e g doctor, dentist, solicitor, education administration, entertainment Possible title for map 'Services available in '

(c) Where must people go for missing services or shops?

WORK ON A JOURNEY

Very complete field records could be made during a journey Children cannot be expected to concentrate for long periods, however, and the following is a short example of one kind of exercise It also exemplifies a problem the teacher may encounter he may not have made the journey himself The work must therefore be based on his geographical appreciation of the area This journey is from Ostend to Brussels, and the work is presented in the form of a questionnaire A simple route map could also be provided

1 Approaching Ostend

a Study the beach and the buildings on the front What does this suggest about Ostend, besides its being a port?

b What vessels besides cross channel steamers do you notice?

2 Between Ostend and Bruges
   a List all the things which tell you this is not England
   b What are the field boundaries? What does this suggest about the drainage?
   c What crops are growing? What is growing in most of the fields? What animals do you see?
   d Write a short note about this kind of countryside

(On the principle given above, the section from Bruges to Ghent is omitted)

3 Shortly after Ghent, i e as soon as the train is clear of the lowlands of the Escaut valley
   a What is the chief difference you now see in the countryside?
   b Look out for the farmhouses Are they bigger or smaller than before? Are the fields bigger or smaller? What are the field boundaries now? Note any crops new to you or which you do not recognise Does this seem to be productive land?
   c Has there been any or much time on the journey when you could not see (i) houses, (ii) villages? What does this tell you about the density of population of this part of Belgium?

If the journey allows time for further work, the next unit should direct attention to the industrial development of Brussels

The Relation of Field to Classroom Work

The whole tenor of the foregoing implies that work in the field should be closely integrated with work in the classroom At present, many teachers have to carry out items of field work as and when they can, and as a result these sometimes tend to be separate pieces of study, somewhat divorced from the rest of the geography course Ideally, the two should be planned together

Ways of integration have already been touched upon They fall into two groups The obvious and elementary form is by content or example The factual content of any visit in the British Isles will illuminate class work when the region or topic is studied either for the first time or in revision 'You saw chalk downs on the way to Salisbury' 'You studied heathland when we went to Bagshot' Local examples of any subject matter should be freely mentioned, but these do not mean a great deal to younger children until they have had some training in observation or made some specific visits A more advanced form of integration is by skills or techniques Elementary mapping skills, learnt by practice, should be again encountered in class The real analysis or an area is made in the field The parallel method in class is by

picture and map study or by sample study Links can also be made by means of concepts Thus a senior class can discover that the local domestic shopping centre is a specialised form of market serving the area[16] Work on specialised markets in London, serving the country or the world, can follow We would stress this principle of *integration by parallel studies*, and give further examples later

A practical method of integration is by the exhibition of work A useful way of reviewing any field work is by the exhibition in the geography room of the records This need not be elaborate When the results are thus readily available, reference can be made to them with other classes when their work touches on the matter displayed

Some suggestions for an integrated syllabus are given in chapter 14 The general ideas on page 290 are implemented as specific items on pages 289 to 303 and we offer here some further comment

As year one is an introductory year, work should draw freely upon local material The syllabus given offers details Both mapping skills and an introduction to the content of geography are included (page 289) Possibilities vary according to area, but broadly we suggest that the maximum possible outdoor work should be done in the first year Any elementary factual material available in the school grounds or nearby should be examined If visits involving journeys to other places are possible, matter such as a farm or stream study can be made suitably elementary

In later years, commencing with year two, the geography in class will extend to countries beyond the homeland, and a different form of relationship with the field work must be evolved This is done by studying such local items as offer a link with the topic studied Thus a study of a local canal could parallel the Suez lesson, a visit to an oil refinery, if nearby, matches with the lessons on Venezuela, local activities connected with commodities, such as milk collecting stations, can be studied when a major producing area abroad is encountered In the scheme given, problems of local water supply have been taken

The same idea is pursued in year three One cannot study everything at once, and inevitably many topics will have been mentioned in class before they have been seen in the field The plan on page 290 is but one possible solution The Mississippi provides such a striking example of a river's activities that it is commonly made a major study during regional work on North

America, and some work on a local river or stream is clearly a link. Local population studies have been included to give reality to the concept of population density needed when Asia's crowded lands are studied By this stage in the course, there will have been other references to the physical basis of geography, and if time and opportunity permit, the children should have by now examined soils and rocks in the field

In the fourth year, increasing maturity of the pupils permits the more sophisticated approach of viewing the subject matter as a whole, and the day excursion which relates land use to structure is a first attempt at this A farm or village survey offers similar possibilities Such work can be continued in the fifth year, though by then the pressure of indoor study for examination work has become strong As then many classes are studying the British Isles in more detail, the problem of integration is minimal Any excursion is a study of some aspect of the current classroom work and will be selected according to local opportunity

We do not pursue this matter for the sixth forms Both regional and systematic geography will be studied in class to a more advanced level, and the relationship to class work of regional surveys or of systematic studies made in the field should be self-evident

Training in Field Work

There are plenty of opportunities, for teachers who feel insufficiently qualified, to learn about field work Perhaps the most important are provided by the field study centres of the Field Studies Council, where resident specialists in geography and cognate subjects give courses for students or teachers The Geographical Field Group organises field study parties, usually to centres in Europe The Geographical Association also organises field Summer Schools, again usually at overseas centres Many of the refresher courses in geography run by Local Education Authorities and the Department of Education and Science include or consist largely of field work training

There is a sufficiently large volume of written work to justify some review of the publications particularly helpful to the uninitiated Briault and Shave give an account of the approach to landscape for geography teachers which will not be rivalled for many years Six chapters give in greater detail what we have summarised here Hutchings' account of landscape drawing

will become a classic. Coleman's scheme of land use categories should be known to all concerned Sauvain gives a concise and severely practical account of the forms of field recording which have been evolved, and the Surrey Fieldwork Society offers a rather different volume of suggestions Roberson shows the material available in urban areas and gives single lesson examples, mainly for younger children, while Bull gives a scholarly and up-to-date account of urban field work techniques for sixth forms. Work by the the two last authors gives guidance on field work abroad, the former gives further detail on the organisation of foreign trips, the latter considers the merits of a particular country as a field centre Wilks gives a fully detailed scheme of field work throughout a school, and Graves examplifies techniques, with particular reference to elementary local work near the school. The University of Manchester's publication *The Purpose and Organisation of Field Studies* is the most comprehensive and recent work on this subject.

Field work is of value and interest to children of all ages and abilities It is beneficial in improving the attitudes of those not particularly interested in geographical study, and may improve the attainments of less able children. Work in the field for these pupils forms only a small part of the school geography course, our next chapter is concerned with their work in the classroom

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11 Oliver, J L The efficacy of outdoor work in improving the attainment of training college students in, and their attitude towards, the subject of geography' M.A., London, 1948

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YEAR ONE OUTDOOR LESSON (HISTORICAL STUDY IN A SCHOOL LOCALITY)

AIM: To discover a local example of the growth of London

MATERIALS REQUIRED.

Individual base maps (Fig 22), without shading and key.

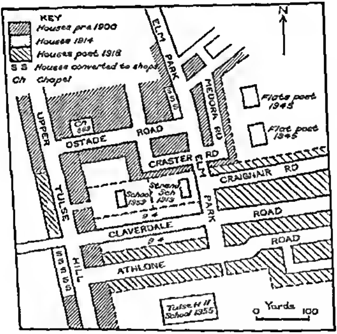


Fig 22 Outdoor lesson historical study of Brixton

METHOD

1 [Conducted walk with map recording A street outline map is provided for each child The material which can be plotted is shown in Fig 22, but the amount plotted by a class will vary with ability and time available]

Introduction Brief discussion Is Strand School situated in a new

or old part of London? [Children approach the school from different directions, and there will be conflicting replies] Let us therefore go and see

2 Walk from school southwards along Elm Park to Athlone Road. Observe and consider age of houses To children they are fairly new. Plot on maps as 'new houses' What is the most recent building? (*Tulse Hill School, 1955*) Plot on map as 'newest'

3 Return via Elm Park to Craster Road/Medora Road corner. Observe and consider age again [Ample evidence of greater age, if only that houses look more dilapidated Basements, less space, much Gothic revival ornamentation] Plot on map as 'old houses'. Any newer houses? (*Post-1945 blocks of flats*) Plot on map as 'newest'.

4 Continue walk via Craster Road, Ostade Road, to Upper Tulse Hill Observe date on chapel, and general homogeneity of area. Complete plotting of old houses, and return to school [20–25 minutes]

5 In class (a) Discussion to clarify key 'Old houses' are late nineteenth century or pre-1914, 'new houses' are 1918–39, 'newest' are post-1945 (b) What is date of school building? (*1913*) School is at boundary between old and new houses, built at edge of built-up area in 1913 (c) Conclusion London has grown in stages, in this case marked by pauses during two world wars Complete maps and add note [15 minutes]

N B Next lesson Application of this example to London as a whole Blackboard map of London 1914 Locate school area Extension of London, by 1939, by 1960 (from text book) Add to blackboard map Show growth by concentric circles Older, earlier Londons can also be found (Add Elizabethan, medieval, London)

LESSON 12

YEAR THREE FIELD WORK

AIM To discover the characteristics of a stream

MATERIALS REQUIRED

Individual copies of base map (Fig 23)

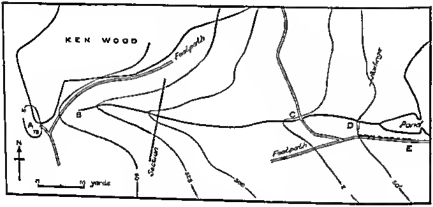


Fig 23 Base map for field work lesson stream on Hampstead Heath

METHOD

[Starting point is at A on map, at the south west corner of Ken Wood This is a knoll with a considerable exposure of pebbly gravel almost bare of vegetation]

We have come out to find out about a stream Why have we come here where there is no stream? Look at the ground, what do you see? (*Many pebbles, dry*) Is there any surface water? (*No*) Is the ground damp? (*No*) Why not? (*Water sinks into gravel*) Yes, rain sinks into the ground here Note these facts on your map We will go to find where the stream begins

2 [Class now stand at B] The pond is in the east—now see that you have your map oriented correctly Find exactly where you are on the map At what height are you standing? (*340*) At what height is the pond? (*Below 250*) What feature, then can you see on the ground leading towards the pond? (*A valley*) Have said we are to

find where the stream begins—now divide into groups to find any evidence of surface water Return in five minutes [On return] What have you found out? Class note findings on map, marking in main spring and seepages Where has the water come from? (*Has seeped out of ground*) From? (*The porous gravels of higher up*)

3 Let us follow the valley a little way [50 yards] Has the stream any noticeable channel? (*Hardly any*) Has it running water in it? (*No, scarcely flowing*) How is it gaining water? (*From seepage from the valley sides*) Now go in the same groups to find out the nature of the ground of the upper valley sides Return in five minutes [On return] What did you notice? (*Upper valley sides of dry gravel as before*)

4 We will move further downstream [Total 100 yards] What do you notice about the stream? (*Has developed a perceptible channel and valley floor*) Draw a cross section of the stream to show this Mark in the line of your section on the map

5 [Move on another 100 yards] In which direction have we walked? (*Downstream*) Now look back You are looking? (*Upstream*) What does the land now show clearly? (*The valley shape*) What do you notice about the sides of the valley? Are they smooth? (*No, they project in small areas on either side*) [There is, in fact, a suggestion here of interlocking spurs]

6 Now let us walk on to the footbridge at C [At suitable points by questioning, lead class to observe (i) miniature waterfalls, (ii) lateral erosion of stream bed, (iii) gullying into softer material and removal of waste, (iv) exposure of softer clay at sides of gullies, (v) steady increase of volume] Class add notes to map to emphasise these features

7 [On to D] Let us see what we have found out so far about where the stream flows In the higher area the land is? (*Dry, porous gravel*) Where the stream flows the land is? (*Impermeable clay*) What has happened here to the shape of the valley? (*Has broadened out*) What has happened to the stream bed? (*It is shallower, wider and swampier*) Draw a section, using the line of railings, to note this

8 [At E, on footpath, where better view of the arm of the pond is available] Can you see the mouth of the river? (*No*) Why not? (*Obscured by reeds*) Is the water deep or shallow? (*Shallow*) Why? (*The pond is getting filled up*) What with? (*The material brought down by the stream*) Mark on your map the shallow, reedy part of the pond

9 Conclusion Let us see what we have found out about this stream [By questions] (i) Its source water comes from gravel beds (ii) Its main valley lies across clay beds (iii) It is cutting itself a channel and so eroding the land (iv) It is transporting the waste material (v) It is depositing this material at its mouth

This is the way in which most rivers work

CHAPTER 9

WORK FOR LESS ABLE CHILDREN

It is possible to consider the school population in terms of those children who are likely to take public examinations, and those who are not It is estimated[1] that of the top ability range twenty per cent of the total school population will take one or more O level examination subjects The next twenty per cent will form the bulk of C S E entrants, but the C S E band is extended to include another twenty per cent likely to sit for the examination in perhaps one or two subjects On this reckoning, therefore, some sixty per cent of the school population is concerned with public examinations The less able children we are to consider in this chapter are those not likely to take either G C E or C S E, they are the non-examination children The lowest levels of these children are probably best regarded as educationally sub normal, and should be in special schools, these children we propose to omit, since they need specialised teaching Our less able children, therefore, form slightly less than forty per cent—the forty per cent of lowest ability—of the total school population

With the inception of secondary modern schools many fears were expressed lest the geography taught therein became a 'watered down' version of that of grammar schools This would imply that there are different types of geography for different children It would appear necessary, therefore, to emphasise that geography is geography, and that taught to any child should preserve the ethos of the subject If 'watered down' means containing fewer facts, we would accept this, less able children are able to remember and handle fewer facts, but these facts should still be those of geography If 'watered down' means less intellectual, this too we accept, but we do not abandon the principle that, as far as possible, children of all abilities should be encouraged to think, and to see simple relationships and explanations It is clearly necessary to examine the ways in which less able children differ from their more able counterparts, in

order to see how the geography they learn should differ, if indeed it should

It is difficult to generalise about the qualities of the less able child There is enormous variation in the forty per cent of the school population we are considering Many take pride in their school work, others appear to be completely uninterested Some read and write well, others find reading difficult and can scarcely construct a correctly written sentence In general, however, the less able child differs from the more able in that he works more slowly His ability to reason may be limited This does not mean that he cannot think, but he thinks more slowly He is not always able to express his thoughts clearly He is less able to appreciate intellectual exercise for its own sake, but may derive satisfaction from such intellectual activity of which he is capable He is able to concentrate for more limited periods He often has less self-control and thus finds it more difficult to pay attention, to refrain from calling out in class, or from speaking to his neighbours He is not always manually dexterous, though, like most children, he may be more interested in work involving physical activity than in intellectual activity

It is clear that the geographical material to be used in the education of these children will place less stress on intellectual aspects There is need to see that what they study has a clear relationship to what they know already, that is it must be related to their own background and local environment There is evidence[2] that children of low ability do not know what the places they have studied are like The content of their geography will be factual, and we suggest that emphasis should be upon description of places and ways of life Such an emphasis offers scope for the development of the imagination and at least the possibility of development of greater understanding of other peoples The problem is not only one of content, but of emphasis and presentation, so that the geography taught assists the child to develop right attitudes and responses to the live issues of his age

A complexity of problems faces the teacher of less able children Many classes include pupils who find reading and writing difficult There is some tendency to adopt the attitude that since these exercises are not easy for the children, they should be reduced to a minimum, in lieu of writing drawing is often substituted One could also argue that what is found difficult needs greater emphasis and training, rather than less There may be some sympathy for those teachers who devote much class time to

writing notes on the board for children to copy, for by this means the pupils gain a written record doubtless of greater accuracy than that provided by other means The pupils themselves may find some satisfaction in this work The disadvantages of such copying are its lack of stimulation of thought, the purely mechanical exercise involved The poor writer needs practice in self expression, and should be encouraged to think while he he writes Written exercises must be simple, and will doubtless take time, but they should be attempted, and corrected with care The stimulus of encouragement is great, and the less able child needs more encouragement than any other for his efforts, which are often considerable

The poor reader needs encouragement to read, the book he uses must be selected with regard to simplicity Short sentences, easy style and attractive print are fundamental No one would minimise the difficulty facing the teacher whose class includes some backward readers If a normal teaching pace is maintained, when reading is involved these are left behind, if reading is geared to their pace, the rest of the class become bored and progress more slowly than they should It is possible to set the class reading silently whilst these children receive individual attention Many teachers are prepared to give generously of their time in helping them to overcome their difficulties, but there is little doubt that the backward reader is handicapped in class work

The main problem of the teacher lies in finding work for the class Since the children find it difficult to pay attention or to concentrate for any length of time, it is essential that all work, whether oral or practical, be designed to last for a time sufficiently short to maintain interest Practical work is taken to mean any work done by the child which involves purposeful activity, in this sense thinking is a practical activity, although seldom regarded as such by the child There is need for short, simple exercises which are within the children's capacity and whose content has some appeal to them It follows that the material given will seldom be of the closely related geographical reasoning type such as is familiar to the examination forms, but will be selected because it is relevant to the children's ability and outlook Sound teaching, as with able children, involves some written work in each lesson Less able children are less likely to concentrate on chalk and talk for a whole period, and geography gives great scope for them to express themselves by doing things Map, chart and diagram are all forms of record which offer

opportunity for satisfying activity and for consolidating factual knowledge without necessarily requiring great intellectual understanding

Let us consider the types of written record which less able children can satisfactorily attempt In essence they will be similar to many of those made by able children, but they will be more simple Maps are essential to geographical training A sample study map of, for example, an oasis can be drawn on the board, or provided by duplication for the class, and the children can, with guidance, list what it shows Simple maps can be built upon the board piecemeal in the lesson, and the child can copy the map using his atlas to provide place names or the names of physical features which have been discussed but of which the board map shows only the initial letter If the atlas is confusing, the place names can be listed on the board so that the child selects the name appropriate to the initial letter on the board map The pupil can be provided with a simple duplicated map on which no feature is named, a similar map being drawn on the blackboard The lesson will involve naming the features shown, and finding the purpose of the map The class can write a few sentences underneath the map saying what it shows, and finally give it a title The older class may trace the main features of a clear text book map, and so draw their own simplified version If a base map has been used in the field, the follow up lesson may take the form of a section across it, with a simple transect diagram below in which the children note what they have seen (Fig 24) Children enjoy puzzle maps, it is occasionally profitable to provide them with a duplicated map, e g of North America, on which certain features such as the main mountains, rivers and towns are numbered The class name the features numbered

Pictures form the major part of many lessons It is possible to build up a description of what is shown in a picture either by means of a blackboard summary which leaves key words blank, and which is copied, and completed by the class, or by the provision of a duplicated sheet of a similar summary on which the children need only to fill in the blanks For example suitable for a first form description of a landscape

(i) The picture shows a low range of   in the background These are the   hills (ii) These hills form moorlands, where grow   ,   and   (iii) The foreground shows part of a valley, which has fields where   is growing (iv) This is the chief crop, but there

are also fields of .... used for .... rearing. (v) The houses of a small........cluster together at the foot of the......

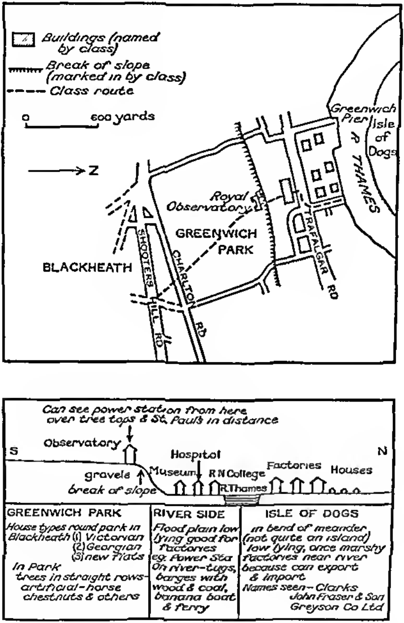


Fig. 24. Map of walk in Greenwich and children's transect record.

A picture of an Arab or a cowboy can be used to produce an annotated drawing showing the relation of clothing to climate or

occupation Comparing the contents of an African hut with those of an English house stimulates interest, particularly in the lack of a clock, differences can be listed Children can make up their own questions about a picture, writing the answers after oral class work

It is also possible, during class analysis of a picture, to draw a sketch of it on the board, which the class can copy and annotate Again, it may be easier for the less able to annotate such a sketch duplicated for them (Plate ix and Fig 25) The teacher can draw the sketch for duplicating by tracing the main features of a picture If a filmstrip picture is needed, this can be projected on to a small sheet of paper, and traced round in pencil to form the master sheet The class can study a text book picture and write answers to questions about it put on the blackboard Two pictures may be studied for contrasts and the class record in two columns the difference between them

The text book offers further opportunities for written work Some text books provide exercises which the pupils can work out It is possible to set exercises the answers to which can be found in the text Answers written as complete sentences framed in logical sequence should form a brief essay (page 93) The teacher can read a paragraph aloud, the class following from their books With guidance the child can then select the most important sentence, and write it down perhaps in an even more simple form Similar treatment of two or three paragraphs results in a brief note summary for the class The teacher may read aloud two or three short passages about the same topic from different texts, and with the help of the class build up a board summary which provides the basis of the children s own records It may be possible to build up a seasonal chart with the aid of a text book, or the provision by duplication of a brief descriptive passage may enable children to construct a similar chart concerning weather, or the differences in landscape during different seasons The circular chart which shows twelve months of the year may prove too complicated for these children It is easier to use four large squares, one for each of the seasons, in which they can either draw or describe verbally the relative activities

Drawing may be used as a means of introducing variety in the written record It is not intended to be a common substitute for writing particularly since the less able child is not always a capable artist. Certain features of geography, however, lend themselves to drawing A series of pin men showing how timber is cut, coal is mined or rubber trees are tapped form suitable

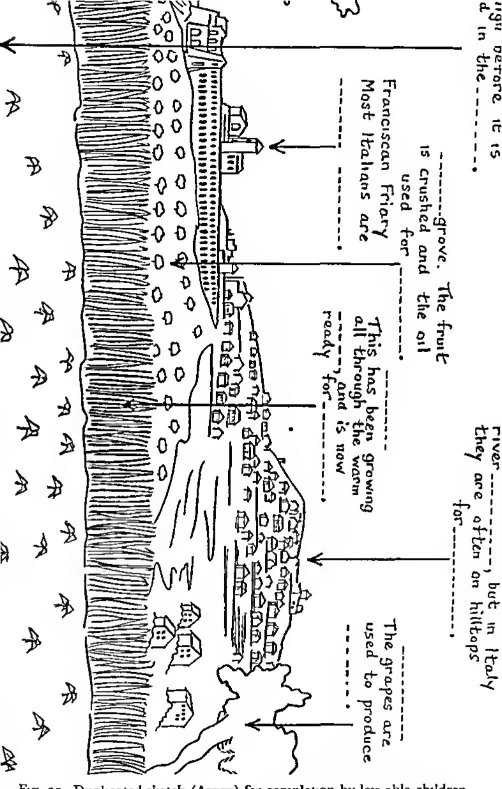


Fig 25 Duplicated sketch (Assissi) for completion by less able children

IN THE ASSISI AREA IN THE EARLY SUMMER

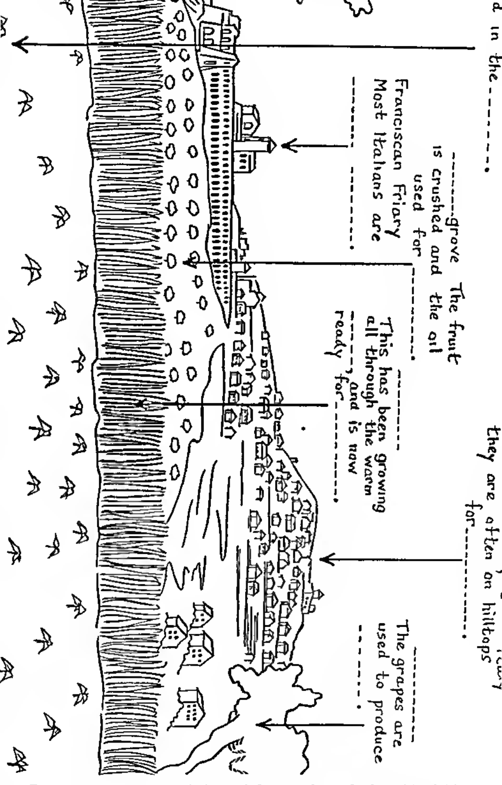


Fig 25 Duplicated sketch (Assissi) for completion by less able children

examples House types can be sketched and labelled to indicate building material and adaptation to climate Diagrams or sketches of physical features, volcanoes, waterfalls or cliffs are useful, whilst the occasional transect sketch section (page 163) may well emphasise the features of a given landscape The use of samples is to be recommended, for these provide reality, and less able children can often produce quite good drawings of objects which they can see Cocoa pods, maize cobs, rice plants and cotton bolls can be drawn, then described, the written description will assist the child s appreciation of the real object, and should normally include an indication of size, feel, colour and, where necessary, smell

It is doubtful whether statistics as such mean much to the less able child, but in simple form their occasional use offers variety in lesson and record Given an alphabetical list of, say, the six major oil producing countries with their production figures, children can re write them in order of importance Figures for the least able might be limited to those of three or four countries only Older children are capable of drawing a simple bar diagram, given guidance in method and scale selection, providing that the figures involved are uncomplicated, e g exports from a Mediterranean country in thousand tons grapes, 60, olives, 25, oranges, 20, lemons, 15 Again, provided that the statistics are simple, that is dealing with proportions such as a quarter, half or threequarters, even the least able can construct pie graphs This exercise is probably easier for them if the necessary circle is constructed by drawing round a penny or similar object, or given duplicated Given the highest and lowest mean monthly temperatures of a region, children can write a simple statement comparing these figures with those of their own country Shown a bar diagram of a year's rainfall, they can name the months in which little or no rain falls, or in which there is heavy rainfall, and can associate these figures with cloud cover or lack of it Children can also use simplified timetables to add reality to journeys taken in class (page 183) In general, however, the use of statistics with these children needs caution

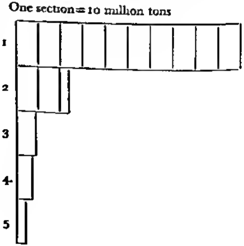
Less able children should also be encouraged to write essays These will differ from those of more able children in that they will be shorter, less intellectual, and perhaps less purely geographical They will be largely descriptive Having drawn a sample pine cone or piece of sugar cane, they can write a brief story about it, such as might be suitable for a museum display

Or the story could be more imaginative, beginning 'I am a ' A common form of approach can be 'A day in the life of' a lumberman, coal-miner, tea planter, or 'The life of' a Danish dairy cow or a bunch of Californian grapes, or simply 'What it is like in' the equatorial forest or the Alps The essays may be brief accounts of people such as the Arabs or the Lapps, written with the guidance of headings such as appearance, clothing, food, homes and transport They may involve simple reasoning, such as is necessary to explain why London is a great port, or why Paris is the capital city of France They may take the form of a record of what was seen on a geographical outing, or a diary as kept on holiday The approach should be varied, and older children might be permitted a choice of approach or topic It is clear that the key word to all exercises, indeed to all work, is simplicity This cannot be overstressed The less able child needs far more guidance in all stages of his work than the able child This is particularly true of the first three years An example of work suitable in difficulty for first forms appears on page 162 If a written description is required from second forms, it will be necessary to provide questions to assist the work Thus, after study of a picture of the Pampas, the exercise might be as follows Copy the first two sentences, then answer the questions The Pampas is in Argentina It is a vast plain What is the land like? What is it divided into? Are the fields very large, large, or small? Are they separated by hedges or wire fences? What grows in the fields? What is it used for? Are there many trees? Where are some trees planted? Given the title 'What the Pampas looks like' the description would therefore be 'The Pampas is in Argentina It is a vast plain The land is flat It is divided into fields The fields are very large They are separated by wire fences Grass grows in the fields It is used for feeding cattle There are not many trees Some trees are planted by the houses ' It is necessary to insist on full sentences for the answers The better children might learn that the grass was alfalfa, this is left to the judgement of the teacher Oral study of the picture, using the same questions, together with the writing would occupy the whole lesson, and even then some children might not finish the work

The different rates at which children work is a problem for all teachers, particularly for those dealing with less able children There is little doubt that the most satisfactory way of dealing with different speeds of work is by the provision of individual exercises, which the children complete according to their ability

Such exercises may be put up on the board, but more profitably by duplication on separate pages which can be stuck in the exercise book or, if not written on, collected for further use Let us suppose that the third forms are studying the Great Lakes–St Lawrence waterway Lesson one might be based on locating the waterway by means of a wall map, atlases and a board map The need for a canal to avoid Niagara Falls, and for the seaway itself, could be discussed, and these added to the board map The class could list the names of the lakes, the ports of Fort William, Chicago, Detroit, Erie, Montreal and Quebec, and Niagara Falls Lesson two might start with a description of a journey from Fort William to Montreal, read aloud by the teacher and analysed by the class This should emphasise scale, and could lead to a board summary and class notes about cargoes carried The next two lessons could be devoted to individual work This could be based on four duplicated exercises, the children either working through them in a given order, or selecting them in order of preference One exercise would involve the provision of a fairly large, clear, simple map of the Great Lakes–St Lawrence waterway, with the six ports and Niagara Falls located, but no features named The child's work would be to name all the features, using the atlas and the list previously made as guides, and giving the map a title A second exercise would be the provision of statistics and a bar diagram as follows, the child labelling the columns appropriately and possibly colour ing them Downstream and upstream products could be tabled

Downstream trade i.e. eastwards	
Agricultural Products	23 (mlln tons)
Coal	8
Iron and other ores	100
Paper and wood	2
Petroleum	5



Children who found this exercise quite beyond their powers could draw a lake steamer or cargo ship, labelling the cargo carried The third exercise needs the provision of a short description of the hazards of travel on the waterway, including fogs, storms and winter ice. Attached questions would ensure that the passage had been comprehended Finally, the fourth exercise might well be the writing of an essay· 'Adventure on a Great Lakes Ship' or 'A journey from Lake Superior to Quebec'. The work can be marked and affixed to the exercise book as it is completed

A variation on individual exercises is found in the individual work file. The selection and arranging of such files takes time, but many teachers willingly undertake the detailed preparation which enables less able children to complete a study within their capabilities The material given in an individual folder will probably include pictures from many sources, pamphlets and a text book, possibly such as one of the Longman's Colour Geography series Questions and exercises are devised which the child can complete using the material provided, a special sheet is included which gives the exercises to be worked, and detailed guidance as to the picture or page which will provide the answer. Such exercises as have already been mentioned can be used Spare copies of duplicated material must be stored to replenish the folder where necessary as each child completes it The work devised can be centred on a particular crop, or country, or a topic such as mountains The individual work folders can be used by different members of the class in turn, a few spare folders being necessary in case a child completes his folder before anyone else is ready to relinquish theirs The child is encouraged to complete the work, this is in itself often a great step forward for such a pupil The teacher can devote his time to helping with individual difficulties, and mark the work as it progresses This type of activity can be geared to suit children of any age

Another form of individual work suited to all ages is the child's production of his own folder of collected material on any given topic Suggestions for the making of such a folder by C S E candidates are given on pages 358 to 360 Instructions and content for less able children will be much less ambitious, but the approach can be similar There will be less writing, and more drawing and collecting of illustrative material Indeed, the least able are capable only of collecting pictures, advertisements and the occasional magazine paragraph under a few simple headings,

for them to achieve this the teacher may well have to provide all the material for looking through and cutting up This form of individual work has its advantages, most children enjoy it, they can carry on with it in their spare time if they wish, and they are encouraged by amassing a gradually increasing amount of data For the teacher its main disadvantage is the dissipation of his material He needs to replenish this by continuous collecting —newspapers, magazines, publications distributed free by industrial firms, travel literature, postcards and so on If each child works on a different topic there is less likelihood of overlap in the sharing out of information Themes such as 'Countries of the Commonwealth' or 'Products from the Commonwealth' give a satisfying unity to this type of individual work

Another form of class activity for less able children is group work This, too can be undertaken at any age It is necessary to make clear that there are two basic forms of group work First, there is that which is organised by the teacher who has insufficient identical items for individual study Within the group each child is doing the same exercise, but each group is studying different data No group leader is necessary, the group is not working collectively, it is really an organisational convenience Second, there is group work organised so that the children work together in teams, each with a leader Each child does one exercise of the team s unit of work, each child therefore contributes something different to the collective work of the team The combined work of each group is then displayed in some fashion A variation of this approach is that whereby each child does every exercise of the team's unit of work, the best answer to each exercise being selected for display Projects form a special type of the second style of group work and are discussed later Group activity of the first type may be completed in one or two lessons, that of the second takes longer The allocation of time for all group work must be judged so that the class can complete the work before losing interest.

One of the most simple forms of group work of the first type can be devised when the teacher has a collection of different pictures which merit study at close quarters The pictures should be mounted under suitable headings For example, some pictures might be of an Indian village in its setting, with a general landscape Others might be of the village farmers at work on various crops, village craftsmen at work, close ups of one or two houses, women collecting water from a tank, cattle drinking and irrigation

water being channelled off For each of the five sets of pictures three or four simple questions should be devised, the answers to which can be found from study of the pictures These questions should be duplicated for each class member, a space for brief answers being provided This duplication is the best method of establishing a full record of the work Alternatively, questions can be printed large under the pictures, and answers recorded in class notebooks, but this is less satisfactory, as the brief answers are isolated from the questions The picture sheets are placed at convenient intervals on the walls The class is divided into five groups, to each of which is allocated a picture sheet for study After five or six minutes each group rotates to the next picture sheet This rotation is repeated until each group has studied each sheet It will be clear that timing must be watched carefully, and the children must stay at the same sheet until the whole class moves on The success of this type of work depends on sound class order, coupled with unselfishness on the part of the children which will enable the smallest to stand nearest to the pictures It is a type of group work favoured by children because it involves movement, but this movement must be orderly It fits readily into a lesson, allowing a few minutes for class organisation and a short period for recapitulation A keen class can mark its own answers during this time

The items for each group need not be solely sets of pictures The teacher may have only one or two such sets Other suitable items can be constructed from a text book, a filmstrip or any other material available Thus one group of children could be projecting the filmstrip, using given frames in a dark corner, another studying a model and another group studying specimens or a chart Where all else fails the last group can study selected passages from their text book Each child in a group does the same exercise individually, the groups rotate

The second type of group work, correctly team work, is co operative The exercises set are different, because they must lend themselves to exhibition As in all group work, they should be of equivalent difficulty, but they must be sufficient in number so that each group member has at least one piece of work to do The material can be put in the care of a group leader, who may allocate the work to be done Each child should be responsible for at least one contribution The final exercise is the pasting of the work on a large sheet of paper for exhibition, or arranging it in a group folder for display on a flat surface The display of

group work is a convenient way of enabling the class to study all the results This can be undertaken in a lesson when the groups, provided with questions to answer, can study the display sheets in the same way as the picture sheets suggested on page 170 It is essential for the class to study all the work done if each group has worked on only one aspect of a country, e g if landscape, climate, farming, towns and transport have been group topics, since otherwise the class will remain unaware of the overall picture An alternative to exhibition work is a report from each group leader, but the success of this depends upon the ability of the reporter The teacher can sometimes give a brief summary himself, commending good work Such reports may not be necessary if, for example, the whole class has first studied rice production in India, then worked in groups on millet, tea, sugar cane, coconut and jute production A sound study of a major crop and any one other is ample for less able children

Projects first entered the educational scene in this country in the 1920 s In its pure form the project is developed as the work initiated by some immediate interest of the child which stimulates his desire to know more Thus a boy wishing to keep rabbits would need to find out what food they required and how to make a suitable hutch, a girl, wanting a new party dress, might wish to draw or select a pattern, choose suitable material at an economic price, then make the dress The project is thus the solution of a problem in its natural setting It has been much altered from its original form, but is still based on a desire to avoid or reduce formal teaching, and to encourage children to pursue their own special interests Projects have now become subject centred and are carried out both by individuals and by groups To save time the teacher usually provides the books and other data necessary for the child s studies, and guides him in his finding out by means of questions

Individual projects entail the provision of a vast quantity of material, and thus can only be undertaken when this is available Able children can often produce much of their own data, they write to information centres, travel agencies, manufacturers and museums and gain access to books from libraries or in their homes Less able children need help, and most teachers find it simpler, though by no means easy, to arrange group projects Children can select their own project titles, but again most teachers, governed by the material it is possible to provide, prefer to suggest them A skilful teacher can lead a class to suggest

the topic he himself intends them to study It is first necessary to amass pictures, pamphlets, articles, magazines, newspaper cuttings, advertisements, brochures, maps, text books and other data *suitable to the age of the class* These may be collected by the teacher from any available source, the *Handbook*[3] devotes a section to sources of informative material

Let us assume that the project is to be entitled New Zealand The class first have a lesson on New Zealand, locating it, and studying briefly one or two pictures calculated to arouse interest The idea of the project is suggested, and the children are invited to write down and hand in all the questions which they wish to ask about the country The teacher then reads through the questions, they normally fall readily into certain categories These are basically how to get there, what the land looks like, what the weather is like, and what the people do in the country and the towns Other questions, such as those about schools, sports and religion can be grouped together under the heading general information The five groups of geographical questions will form the basic topics for study by five separate groups Group one, under the heading 'How to get to New Zealand', will find answers to questions such as where is New Zealand? How far is it from Great Britain? Who first discovered it? When? How long does it take to get there by (i) ship, (ii) air? From which (i) port, (ii) air terminal would you start? How much does it cost? and so on Group two will have as heading 'Landscapes of New Zealand' or 'Interesting Features of New Zealand' Their work will involve marking highland and lowland on a provided outline, drawing and describing Mount Egmont or Mount Cook, describing a fiord, a glacier, a geyser, and collecting pictures of these and areas such as the Canterbury Plains Group three studies New Zealand's weather, quoting specific temperatures and rainfalls, describing the seasons, drawing a summer scene, examples of natural vegetation and so on Group four is concerned with agriculture, and finds out about cattle rearing, sheep farming and fruit growing They may be provided with a sample study about which they answer questions, the plentiful pamphlets available from New Zealand House will form the basis of their study data Group five collects information about industry This involves the study of towns They may select one or two ports about which sets of questions are provided, they may write up any one industry in some detail, they will collect pictures of towns and may locate these on a given outline map Each group

can be given the sheet of questions headed general information to answer if they find detail about them in their search for geographical information

It will be seen that this type of organised project differs from the original project in which the children pursued entirely their own interests The need for organisation is in direct relation to the ability of the class concerned Able children can do projects in their own time Children of very limited ability are not capable of pursuing their own interests unguided to any extent, and may waste an excessive amount of time turning over magazine pages with no clear idea of what they are looking for or where to find it They need detailed guidance by means of short, precise questions, and much time is saved if they are told the number of the page in a given book which will provide the answers They can be encouraged to look up material in the school library with the help of the librarian If they are keeping their own project files, they will be able to mount stamps, labels, pictures or any other item which interests them They are not always good at keeping their files safely, and the teacher may be well advised to collect them at the end of each lesson

Projects and other forms of group study have, since their inception, become increasingly part of educational method in unselective schools It seems necessary to suggest that they form but one way of teaching, to be used, like any other method, sparingly as a form of variety Projects are not confined to geography, unless care is taken the child may have too many projects in progress We unhesitatingly favour group work of the first type (page 170) Group work of the second type involves the ability to work with other people Material has to be shared, agreement reached over the allocation of work The less able child in his earlier years has not always reached the stage of social development necessary for participation in team work. It is not always conducive to work for friends to collect in the same group on all occasions Within the group it is possible for the lazy or diffident child to contribute nothing The work of the least able is likely to be neglected when exhibitions are mounted, he is thus discouraged The group leader, even when wisely chosen may tend to give the material for study to his friends, or even keep that which is most attractive for himself The teacher is responsible for seeing that all the children are learning, he must be clear in his mind as to the purpose of group work. The brouhaha which sometimes accompanies the cutting out

and pasting on of pictures gives an impression of purposeful activity which is quite misleading Nevertheless, the occasional inclusion of well-organised group work can bring to the less able child fresh interest in geography.

We have been considering work and exercises which the children can do formally or informally. Most of this will be undertaken in the set lesson, and it is thus to the lesson that our attention must next be given Again the key word is simplicity. The lesson will be constructed along the lines suggested in chapter 3, but the aim will be a simple one and the steps of development fewer and less complex The summary which has been built up during the lesson will normally contribute the answer to the problem posed, i e the conclusion Lessons should be linked to what is known to the children Thus in North America 'Why cattle are reared on the High Plains', suitable for able third years, becomes 'Why cowboys still live in the wild west', or 'Why the west is no longer wild' 'How the geology of Florida influences land use' becomes 'Why Florida is the playground of U S A'. 'To find out why the Southern States produce so much cotton' becomes 'The story of a pair of jeans' A lesson dealing with the geographical environment of California is dealt with by means of 'Why Hollywood produces films' Work on the Mississippi River can be simplified to 'Why the Mississippi River floods', which leads naturally to the next lesson on 'How man tries to prevent the river from flooding' In all cases the facts dealt with will be few It is often difficult for the young geography specialist to accept this, the experienced teacher appreciates this necessity. The facts can be clothed with detail likely to stimulate interest and assist recollection, but they will be essentially limited in number The content may not be formally geographical Thus the facts summarised in the lesson on Florida will be (i) sub-tropical weather throughout the year, (ii) warm seas for swimming, sailing, fishing, (iii) long, sandy beaches, (iv) interesting places to visit, e g the Everglades, the citrus groves, (v) luxury hotels Facts can be gathered by the question and answer technique, but in general not more than six questions should be asked in succession Less able children do not remember what has gone before easily, even when board summaries exist Brief revision, if only by means of a sentence, is constantly necessary After a section of questioning, the class might begin to build up its own record The pattern of the lesson, using as much variety of approach, material and ways of recording as possible, differs little from that of lessons for

the more able. Since the children think and work slowly, far less material can be covered in a given time

The limited amount of matter contained in any one lesson means that the syllabus prepared for the examination children cannot be achieved by non examination classes Yet for the first three years the less able children should probably be taught geography through the same areal framework as all others This involves in year one local geography and selected environments at home and overseas, in year two the southern continents, and in year three North America and Asia These continents have been selected because they are the most suited for study to develop geographical understanding and skills, they are graded in difficulty of concept Furthermore, the work of some of the less able children may improve sufficiently to merit their upgrading If they have studied broadly the same continents they will be at less disadvantage on transfer than if their studies had been of entirely different areas It is within this framework, therefore that their syllabus needs amendment The first year's work will lean heavily on local studies, the selected environments will be fewer For each continent the teacher will extract only the most vital geographical highlights for study, bearing in mind that they must have appeal for, and their study be within the capabilities of, the children In South America he may select only the Amazon Basin, the Andes, the coffee of Brazil—still half the value of its exports and frequently two thirds[1]—the beef of the Pampas and Rio de Janeiro as a port study In Africa he might select the equatorial forest for brief revision, some aspects of the savanna including its wild life, the Sahara, Egypt and the production of cocoa and gold He should prune ruthlessly Work which able children can cover in one lesson may take his children three or four lessons, his syllabus must be devised to permit the most effective use of the time available Contrary to popular belief, less able children have less time relatively for study, because they are slower

Despite the efforts of teachers, there seems to remain in most schools the hard core of children to whom nothing scholastic seems to appeal This is particularly true of the fourth year pupils who are impatiently awaiting the opportunity of leaving school How can these children be enabled to find some interest in geography? They can sometimes be aroused to feel genuine concern for the difficulties of others An appeal to the emotions often awakes a response of which the teacher is aware although

the children may have difficulty in expressing it The social injustice of world starvation, the horror of plagues of locusts destroying crops, cattle dying of thirst in drought, arouse sympathy This is more difficult to inspire in the case of the peasant patiently treading his water wheel, or harvesting his rice by sickle Such time consuming occupations may well evoke scorn unless the teacher's explanation is skilled Nevertheless, the children generally show some feeling for current world problems, particularly if it is made clear to them that the ability to discuss such affairs with some authority gives them status in the eyes of their fellow men The rest of their work should be geared to whatever geography can be seen to have direct concern with their own lives

To conclude their geographical studies the fourth year need some revision of the British Isles, some knowledge of Europe and world revision Since they are soon to leave school the teacher may start with places of work in the locality, offering considerable detail of the possibilities By contrast this could lead to places of amusement in the locality, these could be located on a base map Holiday areas in Great Britain could next be explored, a local coastal resort being studied to find reasons for its popularity This could then be contrasted with a holiday area such as the Pennines Since information on holiday resorts is plentiful, work on holiday centres could be initiated, each child selecting a centre, mapping a route there, and planning what he could do on holiday This work could lead on to a lesson on the main roads of Britain, and another on why it is difficult to make railways pay The term's work could conclude with a group study of world transport One group could investigate vehicle production at, for example, Ford s Dagenham plant, collect pictures of different cars and lorries, and include the production of tyres A second group could concentrate on aeroplanes, with some detail of air ports and main world air routes Two groups could share shipping, one dealing with ships designed for specific cargoes, the other dealing with passenger and general cargo vessels The fifth group could study animal transport, such as horse, mule, camel, yak and dog

Second term study of Europe might start with naming neighbouring countries on an outline map, one main sea link with each being inserted The class might then decide which of their neighbour countries they should know something about They should find interesting a lesson on the wines of France, another

on how the Dutch keep the sea at bay, a third on Berlin. This could lead to some study of the U.S.S.R. This might be approached along the lines of why Russia is so important today, with emphasis on her vast natural resources. It could be concerned with Russia's contribution to the space age, or why the British might not take kindly to communal farming, or be based on the use of any current news item likely to capture the interest of the class. Since nowadays there is at least some possibility that these children will travel to the continent, they might prefer study by means of a journey from Moscow to Vladivostok. This might introduce further work in groups on Norway, Denmark, Germany, Belgium, Switzerland and Spain or Italy as holiday centres. A final revision lesson in which air routes to the continent are mapped concludes the study of Europe.

The third term can be devoted to world studies. This is an academic concept, but must not be interpreted as such for these children. They might start with group work on dress for girls, on power for boys. For girls a lesson on fabrics would lead to a list including cotton, linen, silk, wool and nylon. Each group would investigate how one of these materials is made. They could collect advertisements and pictures of dress in their own and different parts of the world, describe it, and annotate drawings to show how it is adapted to climate. For boys a lesson explaining very simply how hydro-electricity is produced could end with a class list of forms of power such as human, animal, coal, oil and water. The group studying man-power could deal with its use in their own country, and in areas where, in large numbers, man builds roads, irrigates, harvests by hand and is an agent of transport. Animal power would include water buffaloes, reindeer, llamas and elephants. The child's normal interest in animals might then be used for a lesson on how wild life was saved when the Kariba dam was built. The mention of the project could lead to further work on water, first on the supplies of their own country, leading to areas where water is in short supply such as a famine area in India or an outback station in Australia. Finally, a lesson on farming misfortunes in our own country, such as foot-and-mouth disease and fowl pest would lead naturally to study of world pests such as locusts and the tsetse fly. In lessons on each the class could draw the insect, shade in infected areas on a provided outline, and add a few notes on how man attempts to control the pest. A final lesson could summarise the work of the relevant United Nations departments.

In conclusion, it must be added that for less able children, more fundamentally even than for more able children, teaching geography is not enough It is vital that the teacher always bears in mind the fact that he is teaching children He should know his class The background of the child influences his attitude to school work, understanding of his interests and ambitions enables the teacher to assist in his development At heart children expect to be kept in order in school, they have little affection or respect for those who cannot inspire either These children need genuine interest to be shown in their work and progress, they need coaxing and the encouragement of praise They need to see that their efforts are appreciated, and that effort is expected They need to experience success They are not encouraged to try again by failure Difficulty forms no stimulus to effort, it merely spells defeat The teacher who can devise a test for which everyone gets full marks, or who produces an exercise which the whole class can complete correctly in a short time, is on the way to success in teaching the less able child No teacher will succeed entirely until the children are convinced that he is genuinely, in their own phraseology, on their side

NOTES

1 *Examinations Bulletin No* 1 *The Certificate of Secondary Education* H M S O 1963, p 113

2 Roberson, B S 'An enquiry into the degree of understanding and appreciation of geography reached by children aged 14 to 15 years in the last years of attendance at school' M A, London, 1961

3 *Handbook for Geography Teachers* Methuen 1964 (5th edition), pp 147–204

4. Butland, C J *Latin America A Regional Geography* Longmans, 1960 p 345

YEAR FOUR BRITISH ISLES (SOUTH-WEST PENINSULA)

AIM To discover why the South west Peninsula is a good holiday centre

MATERIALS REQUIRED

(i) Outline map with advertisement (Fig 26) (concocted)
(ii) Atlases
(iii) Wall map (optional)
(iv) Board map as outline map

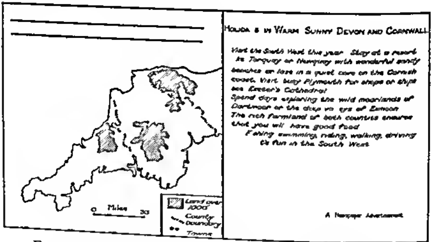


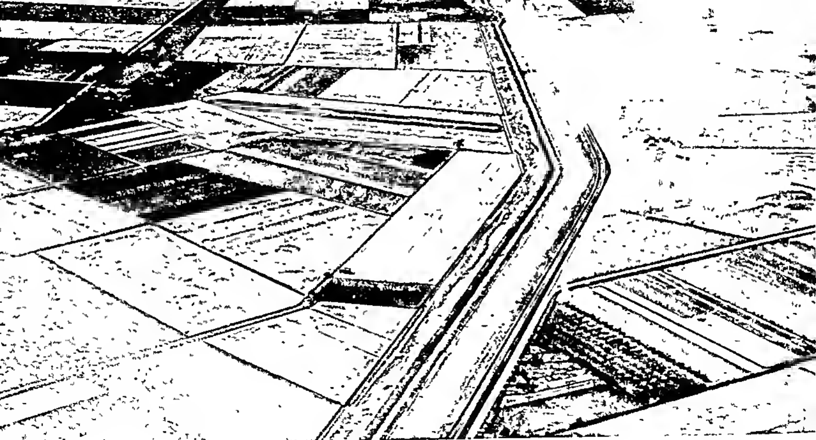
Fig 26 Work sheet for lesson on the South west Peninsula

METHOD

1 [Give out maps] This is an advertisement suggesting that holidays can be exciting in two particular counties—which are they? (*Devon and Cornwall*) Read paragraph aloud, class following It is an advertisement about Devon and Cornwall The first sentence tells you whereabouts in Britain these two counties are? (*South west*) Find them on your atlas map, page *xx* These two counties together form the South west Peninsula Your printed map also shows these counties

INTENSIVE MEDITERRANEAN CULTIVATION NEAR VENTIMIGLIA

XI WINDBREAK AGAINST THE MISTRAL NEAR TARASCON



XII FENLAND LANDSCAPE

Which lies to the east? Which to the west? Print the names Devon and Cornwall carefully on your map, put them in a part of the land that is not shaded

2 Re read second sentence aloud What is a resort? (*A place where people go for holidays*) Which towns or resorts are named? (*Torquay and Newquay*) What does the fact that they have wonderful sandy beaches tell you about where they are? (*On the coast*) Find them on your atlas map They are the two small dots on your printed maps Torquay is in? (*Devon*) Newquay? (*Cornwall*) Print their names by the dots Take care to name them correctly

3 What is the next town named in the advertisement? (*Plymouth*) What are we told to visit there? (*Shops and ships*) How can we tell that there are lots of shops? (*It says it is a busy town*) What sort of town has a lot to do with ships? (*A port*) So Plymouth is not only a shopping centre, it is a port Which dot do you think stands for Plymouth? (*The big dot*) Write the name Plymouth by the dot Put the word port or ships underneath in brackets Now you can tell what is the name of the last town shown by a dot? (*Exeter*) What is Exeter famous for? (*Its cathedral*) Name Exeter Actually we hear a lot in summer about Exeter on the radio? (*Traffic jams*) So we should try to avoid Exeter at week ends

4 Read the next two sentences What other places are named? (*Dartmoor and Exmoor*) What are we told about Dartmoor? (*It is wild moorland*) What is moorland? (*Open country with heather, bracken, grass, few trees*) Why do you think it is called wild? (*Few people live there, is in natural state*) What do you know about Dartmoor? (*Has a prison*), and something more pleasant? (*Wild ponies*) Find Dartmoor in your atlas Which county is it in? (*Devon*) Name it on the shaded part of your map—see that you have the correct area, the southern area Exmoor is the northern area, near the north coast of? (*Devon*) How is this described? (*With deep valleys*) Is similar to Dartmoor in that it is natural, open, lonely country, but it has deep wooded valleys, so more trees than Dartmoor On your printed map there is another area of highland which we haven't named It isn't mentioned in the advertisement—can anyone find from the atlas what it is called? (*Bodmin Moor*) Good—this is another moorland area Now name Exmoor and Bodmin Moor

We can now give our map a title 'A map to show some holiday centres in Devon and Cornwall' Write this on the top two lines above the map

5 We now know where some of the holiday centres in the South-west Peninsula are—let us see if we can make a list on the board of

why we would like to go there for a holiday What does the advertisement tell us that makes it sound interesting? [Board summary 'Why the South West is good for holidays' (i) Sandy beaches, (ii) quiet coves, (iii) Plymouth for ships and shopping, (iv) country like Dartmoor and Exmoor (and Bodmin Moor)]

We can also add a few facts that we haven't so far mentioned What about the weather? (*Warm and sunny*) This is advertisement, so may be optimistic What about food? (*Good*) Why? (*Because there are farms*) What food will you get from farms? (*Butter, cheese, eggs, milk*) and also can get fresh fruit and vegetables And from sea? (*Fish*) So food is splendid There is also plenty to do—what does the advertisement suggest? (*Fishing, swimming, riding, walking and driving*) Other things you can generally do on holiday? (*Dancing, tennis, golf, amusements, visit cinema, theatre*) Yes, there is plenty to do So can add to board list (v) warm sunny weather, (vi) fresh farm produce and fish, (vii) plenty to do

6 Conclusion The South west Peninsula is good for holidays because it has warm weather, different types of coast scenery, rich farmlands and open moorlands, big and small towns, good food and offers plenty to do

N B Depending on ability of class, and therefore their speed of work, they might be able to make their own summary as a conclusion, writing this

LESSON 14

YEAR FOUR EUROPE (ITALY)

AIM To discover different types of landscape in Italy

MATERIALS REQUIRED

(i) Outline map of Western Europe, timetable and blank chart (Fig 27)
(ii) Atlases
(iii) Filmstrip Common Ground CGB 530 Frames 1, 4 and 24

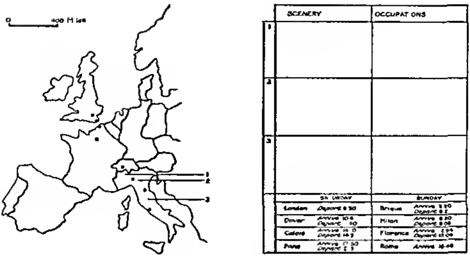


Fig 27 Work sheet for lesson on Italy

METHOD

1. Are going to find out how to get to Italy and what country looks like there by going on a train journey to Rome You have been given a timetable for the journey What do you notice about it? (*The railways use a twenty-four hour clock*) Which is the first time that shows this on the timetable? (*Calais arrive 14 10*) What time is this? (*2 10 p m*) and leave? (*14 37*) this is? (*2 37 p m*) Twenty-four hour clock is easy to follow—why? (*Don't get mixed up between a m and p m*) So now can follow times on the timetable

2 Are going to use the timetable to help us plot our route on the map We start from? (*London*) Name this neatly on map We go next to? (*Dover*) Why? (*Because is a port for cross-channel steamers*) Then what should we have to do at Dover? (*Get on the boat*) Name Dover on map, and the port we arrive at, which is? (*Calais*) Where do we go from Calais? (*To Paris*) Which country is Paris in? (*France*) Name Paris. Which is our next stop? (*Brig*) Look in your atlas to find which country Brig is in? (*Switzerland*) When do we arrive in Brig? (5 20). On which day? (*Sunday*) So have already been travelling? (*Nearly a whole day*) Can anyone say exactly how long? (*19 hrs 50 mins*) Name Brig We leave Switzerland and arrive in? (*Milan*) Which country is this in? (*Italy*) So are beginning the Italian part of our journey, which takes us also to? (*Florence and Rome*) Now name Milan, Florence and Rome Join up to dots with a coloured line, and put a key to show that this is our route How long has the whole journey taken? (*31 hrs 16 mins*) How many countries have we travelled through? (*Four*) And we are finally in Italy.

3 What time of day was it when we left Brig? (5 27) What does this mean? (*Early morning*) So as we enter Italy we can look at the scenery [Blackout]

Frame 1 This is what the country looks like near the frontier What kind of country is this? (*Mountainous*) Look in your atlas and find the name of these mountains (*Alps*) These are the Alps How would you describe them? (*Steep, rugged, high*) What is on the tops of them? (*Snow*) What is on the slopes underneath? (*Mainly forest*) Can you see what kind of trees? (*Conifers*) Where is the village? (*At the foot of the slope, in valley*) On your chart, where it says 1, is a space for notes about this first picture In the square under scenery, write the words The Alps Now write a few sentences or words describing what you see in the picture

Now we know what the mountains look like Can you suggest any ways in which the people living there might earn their living? (*Tourists, timber and farming*) Add these to the box labelled occupations To make sure you remember what your notes refer to, put a 1 on your map just south of Brig, in Italy This is where the picture was taken Put 'The Alps' where it says 1, at the side of the map

4 As we travel south towards Milan the countryside changes This is a picture of the country near Milan

Frame 4 What kind of country is this? (*Flat*) What do we call an area of flat land? (*A plain*) This picture is part of a great plain called the Lombardy plain Are there many trees? (*No*) What is the land used for? (*Crops*) Is any of the land wasted? (*No*) What does this tell us about the land? (*It is good farming land*) Yes, can grow many crops here such as rice, wheat, vegetables Many of the trees are mulberries What does this suggest? (*Silkworms*) Where do the people live? (*In villages*)

Now fill in block 2 Describe the scenery first, then the occupations What are you going to call this area? (*The Lombardy Plain.*) Then put a 2 on your map near Milan, and add 'The Lombardy Plain' to the 2 beside the map

5 When we leave the Lombardy Plain, we continue travelling south to Rome On our way the scenery changes yet again Here is our third and last picture

Frame 24 What kind of country would you call this? (*Hilly*) Yes, not such high land as the Alps Are there any trees? (*Yes*) What kind of trees? (*Deciduous*) Some are olive trees Now see if you can fill in block 3 on your own Must decide a heading first Look in your atlas

to find the name of these lower mountains Is? (*The Apennines*) Put this as a heading Don't forget to put a 3 on your map between Florence and Rome to show where the picture was taken Add the title 'The Apennines' to the 3 by your map

6 Conclusion In our ten hours' travel from the frontier of Italy south to Rome we have passed through three quite different types of country These are the countrysides of? (*The Alps, the Lombardy Plain, the Apennines*) This makes Italy a very exciting country to visit

CHAPTER 10

MATHEMATICAL GEOGRAPHY

Introduction

The division of the subject into regional and systematic geography has been touched on in chapter 2 and our general position made clear There are nevertheless problems, particularly of organisation At higher levels they hardly arise 'Systematic and regional geography need not be thought of as rivals, but rather as complementary, for each can fructify the other '[1] The more advanced student at, say, fifth form level and above can see the need for specialist studies and yet keep a unified view of them At lower levels we believe that the organisation of subject matter into such separate divisions as physical and human or regional geography militates against the formation of a concept of geography as a unified or unifying subject 'It was felt that an *integration* of systematic and regional geography was desirable, for both methods were complementary and interrelated '[2]

Our integration is by what may be called *planned incidentalism* The elements of physical geography, and as deemed desirable, other systematic branches, are introduced at relevant points in the first three or four years of the secondary school In the main, facts are presented rather than generalisations, and explanations —which may involve theories—are kept to the simplest minimum From about age fourteen or fifteen, with the child's increased maturity of mind, generalisations and abstractions can appropriately be made, and more detailed explanations considered This principle is developed throughout the following chapters on physical geography, and implemented in the syllabus in chapter 14

The scope and content of a marginal or bridging branch of geography such as mathematical geography is difficult to define precisely Most examination syllabuses do not consider topics under the heading of mathematical geography, if the subject is included it is as part of the elements of world geography, or as

physical geography in its broadest sense It seems logical to include all aspects of geography which use mathematical processes as a major part of their method as mathematical geography This would establish four main sectors, namely 'pure' mathematical geography dealing particularly with the physical setting of the earth with respect to the sun and the universe, map projections, surveying and statistics Whether these sectors should be accorded similar emphasis in school geography involves further consideration It is certain that mathematical geography may frighten those not used to mathematics It also contains the implication of yet another specialist branch which may make for subdivision of our subject It is better, therefore, to think of these matters as the mathematical basis of geography, rather than as a separate compartment of geographical knowledge

For the majority of teaching the first sector, 'pure' mathematical geography, is the essential Olive Garnett[3] suggests how much juniors should learn of such geography, but few writers have considered what should be taught to seniors, and why General education for the understanding of newspapers may involve explanation of test match times in Australia or boxing match fixtures in New York, and of terms such as the midnight sun A citizen's ability to use land, sea and air timetables may depend on an understanding of time zones and the international dateline More specifically, in geography such terms as the equator, the tropics and meridians are commonly used and should be understood Further, if we accept that geography in school is a study of the interaction of man and the landscape we have another useful criterion of selection, differences in landscape occur as a result of climate, therefore we must understand latitude and insolation What emerges from consideration of how much 'pure' mathematical geography we should teach is based on what we need to understand human geography It is necessary to know what is meant by latitude and longitude and special cases thereof, why time varies in different parts of the globe, why the length of day and night varies, and why there are seasons

There are six basic facts or groups of facts which must be learnt, they are fundamental to the understanding of 'pure' mathematical geography First, the earth rotates It rotates from west to east, and completes each rotation in twenty four hours Second, when a sphere rotates there are two points which do not appear to move In the case of the earth these are called the poles, and the imaginary line joining them is the axis of the earth Third, the

earth revolves round the sun, completing each revolution in approximately 365¼ days Fourth, the axis of the earth is not at right angles to the plane surface which it follows in its revolution or orbit round the sun, but is inclined to it, or slopes at an angle of 66½° This plane surface is known as the plane of orbit or the plane of the ecliptic For teaching purposes, once the tilt of the axis from the plane of orbit has been explained, children are less confused if they learn that the tilt of the axis is 23½° from 'vertical' Fifth, the tilt of the earth's axis as related to its orbit round the sun is practically constant Sixth, rays from the sun, which is approximately 93 million miles away, are virtually parallel when they reach the earth

Public examination answers reveal clearly that there is tremendous confusion in the minds of sixteen year-olds on these points, particularly with regard to the direction of the earth's rotation and the angle of tilt, which is commonly held to vary according to the seasons The difficulty found by many children in understanding the basic principles of the phenomena arising from the setting of the earth in respect to the solar system is sometimes due to lack of co-ordination between the mathematics teaching and that of geography Few children have studied geometry before their first year at a secondary school, and it takes time before the concept of plane geometry is fully developed Yet sometimes attempts are made to demonstrate phenomena associated with three dimensional geometry at the beginning of the first year's course as an introduction to the basic principles of world geography Mathematical geography should surely be linked with mathematical teaching, the teaching of both subjects should improve as a result of excursions across the subject boundaries Mathematical geography is more easily learnt through a series of carefully graded steps as need arises throughout the school course It is best not taught as a separate topic, but can be used to illuminate regional geography, in relation to particular areas

The first year syllabus will certainly include study of the homeland, and offers opportunity for the development of simple concepts such as that of day and night, some study of which may have been made already in junior schools If a pointer, such as a knitting needle, is mounted vertically so that the path of its shadow can be traced across a piece of card or paper, the angle of the sun can be found The longer the shadow of the needle, the lower the angle of the sun (Fig 28) A series of readings

taken at different times during the day establishes the fact that the sun's angle alters, that is that the earth has moved in relation to the sun A representative trace for each month, plotted on a good sunny day, with the date noted and times of sunrise and sunset taken from the newspaper, written towards the end of each trace, would give throughout the year an indication of the relation between sun angle and length of day Such records, kept by a first form, should help them to understand that as the length of day changes here with the time of year, so it can vary in other parts of the world This would lead to the special case of equal day and night at the equator, if the equatorial forest were being studied as part of the outward extension of regional geography towards the end of the year At this point, rather than before, a simple demonstration to show how daylight and darkness come in succession to different parts of the earth can be made

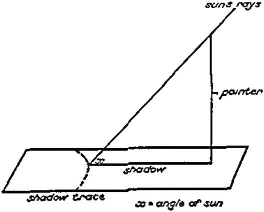


Fig 28 Shadow trace record

It is not advisable to use a fixed model of the earth and sun for such a demonstration It cannot be a true scale model, for given a sun of 5 inches diameter, the earth should be of half inch diameter presented 160 yards away The brighter children might themselves like to calculate such a scale, given the sun's diameter as 860,000 miles, the earth's diameter as 8,000 miles, and the distance of 93 million miles from sun to earth For classroom purposes the globe suffices, in a darkened room play a shaft of light from a filmstrip projector or similar source onto the globe placed in the equinox position, the division between daylight and darkness passing through both poles Use this demonstration for establishing the rotation of the earth from west to east, and the stillness of the points known as the poles When the phenomena of daylight and darkness have been understood and recorded, it is worthwhile to extend the demonstration Golf tees attached by plasticene vertically to the globe surface at various places throw shadows which, as the globe rotates, behave like the shadows

which the children have been recording It may be observed that the shortest shadow which can be obtained, corresponding to the noonday shadow, at each place points towards the pole to form, in fact, a north south line In the northern hemisphere these shadows point north, in the southern hemisphere they point south This observation should be remembered, as it makes a useful starting point for later mathematical geography.

In year two the geography syllabus commonly deals with the southern continents, with some emphasis on range of latitude, vegetation, climate and agriculture During this year mathematical geography will help to indicate why temperatures vary with latitude It is convenient, therefore, to establish what is meant by latitude, it is equally convenient to include longitude, with which it is simpler to start

The children will by now be familiar with Ordnance Survey maps Latitude and longitude can be treated as an extension of map work. Children who use Ordnance Survey maps are accustomed to grid lines, and latitude and longitude are fundamentally similar to northings and eastings, that is a position-finding mechanism with a geometrical basis If the globe is shown to the class with the North pole facing the children, they can compare the view with that of a North polar zenithal map in their atlas Reminders that the shortest shadows of their records were always measured at midday, and that during the globe and light demonstration the shortest shadows always pointed to the north in our hemisphere lend reality to the fact that all places on the same meridian have midday at the same time, it is *because* of this, in fact, that they are called meridians They are, therefore, time lines They are, for children, the same as the north south lines with which they are already familiar on their Ordnance Survey maps The incidence of the primary meridian at Greenwich owing to British dominance in nautical matters can be noted The children can measure the angles of the zenithal map east and west of Greenwich meridian to re-discover, as they have learnt in geometry, that 360° are represented, and that the meridians are numbered east and west of Greenwich The insertion of 0° and 180° in chalk on the globe would emphasise not only the imaginary nature of these lines, but the fact that 180° E and 180° W are in fact the same line, a continuation of 0° longitude The children could then construct their own polar zenithal graticule with meridians at, say, thirty-degree intervals A final summary would include reference to the globe with the

South pole facing the class, then to the pattern of meridians round the whole globe

Lines of latitude are circles drawn round the earth parallel to the equator, and at a constant angular distance from it, their position is really determined from the midday altitude of the sun Latitude lines are therefore sun lines It is possible to calculate the latitude of your own location by observation of midday sun altitudes,[4] but most teachers find it convenient to construct a diagram which shows the plane of the equator through the globe calculating angles of latitude from the central point of this plane, where it bisects the axis imaginarily joining the North and South poles (Fig 29) It should be made clear that the plane at the equator is really round, although it looks elliptical in the diagram Similarly latitude 50° N. is round, though appearing elliptical For children there is need to emphasise that only one line of latitude, the equator, encircles the globe at its fullest circumference, the other eighty nine lines of latitude are smaller circles, and the ninetieth 'circle' is merely a point, the North pole, or latitude 90° N Similarly the latitude of the South pole is 90° S These lines of latitude which, like meridians, can be divided into smaller angular units called minutes and seconds, are comparable with the east west lines with which they are familiar on Ordnance Survey maps

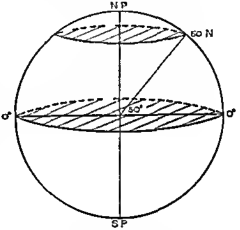


Fig 29 Diagram to illustrate latitude

Second year geography teaching, as stated, commonly concerns the southern continents, so that the problem of differing seasons in the southern hemisphere arises For second year pupils only a very simple explanation need be given, for experience shows that too much detail given too early leads to confusion later The children are aware that the earth rotates on its axis, from west to east, making one complete rotation in 24 hours Indeed, the more able might enjoy calculating the speed of rotation at the equator, given the circumference of the earth as

24,902 miles Now it is necessary to emphasise that the earth's N S axis is tilted at an angle of 23½° from vertical, and that this angle of tilt is constant Demonstration with a globe and a light source in a darkened room will show how this gives rise to unequal lengths of day and night A simple diagram drawn after the demonstration will help to emphasise this (Fig 30) This diagram introduces simply the concept that when people living north of the equator have fewest hours of daylight and most of darkness, those south of the equator have short nights and more numerous hours of daylight It also revises a point already learnt, that of equal hours of daylight and night at the equator For the

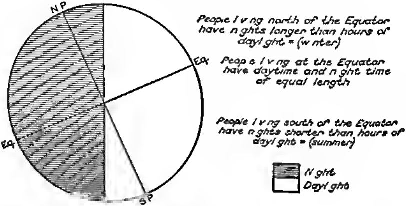


Fig 30 Simple diagram to explain different lengths of daylight and night

majority of children this suffices for the seasons At all times at the equator day and night are equal, therefore there are no seasons as we know them, when northern people are experiencing the long winter nights, southern people are having the longer days of summer, and vice versa Further explanation is best left to the fourth form and fifth form revision course, and will be dealt with later in this chapter

The only other explanation necessary in second year mathematical geography is that of insolation The children are familiar with parallel lines in geometry, it is therefore possible to establish that the rays from the sun, which is approximately 93 million miles away, are virtually parallel when they reach the earth The customary diagram (Fig 31) needs careful handling It is probable that it should be used only to show that the three sets of rays do not fall on equal areas of the earth's surface Recent

scientific studies indicate that it is inadequate to account for the relatively small amount of insolation absorbed at the surface in high latitudes by drawing attention to the greater length of path of rays A through the earth's atmosphere Jackson[5] states that the depth of the atmosphere is only a minor factor in determining absorption He emphasises the great importance of 'the albedos of the earth and its atmosphere, that is, the proportion of insolation which is reflected by earth and atmosphere and not absorbed Solar radiation which is reflected is not converted into heat and most is eventually lost to space It is mainly because the polar

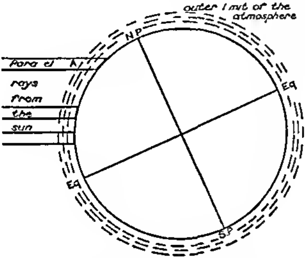


Fig 31 Diagram to show that the sun's rays do not fall upon equal areas of the earth's surface

regions possess high albedo values, both in their surface characteristics and in the clouds above the surface, that the high insolation totals received in summer are comparatively ineffective' Clouds have particularly high albedo values, so have snow cover and ice masses The latter act as strong reflectors until they melt, the proportion of absorbed solar energy which is used in melting ice or evaporating snow further helps to reduce soil and air temperatures during the spring and early summer In the tropics less than one third of all insolation is lost by scattering and reflection and about one half is absorbed by the earth s surface, at 80° N the proportions seem to be reversed Clearly explanation of insolation should be linked to these facts and to the teaching of climate in regional geography

The third year syllabus often concerns North America and Asia. Teaching about these lands will necessitate some reference to the Arctic Circle, and since these are lands of lengthy trans-continental railways, they also provide a convenient opportunity for the study of time zones. Concern with the special latitude line of 66½° N. offers a stepping stone in the build-up of the children's concept of the seasons. Latitude lines are known to be sun lines, hence the Arctic circle is a latitude line illustrating some special circumstance of the earth in relation to the sun. In teaching it is helpful to revise the rotation of the earth from west to east, and to re-emphasise the tilt of the earth's axis at a constant angle of 23½°. Then introduce the idea that the earth also revolves round the sun, making one complete revolution in 365¼ days. The revolution of the earth around the sun and the inclination of the axis together not only cause the ever-varying lengths of day and night, and are responsible for the change of the seasons, but fix, along with other special cases of latitude, the Arctic (and Antarctic) Circle. Place the globe with the source of light shining directly over the Tropic of Capricorn (winter solstice position of December 21st) to show how areas from 66½° northwards rotate in darkness for the 24 hours of that date. Walk with the rotating globe round the source of light to place the globe with the sun overhead at the Tropic of Cancer, in the summer solstice June 21st position. This will demonstrate the incidence of 24 hours' daylight from 66½° northwards. Repeat the demonstration to point out the reversal of occurrences south of 66½° S. Then draw a simple diagram to illustrate the demonstration.

This diagram (Fig. 32) could well be duplicated for class use,

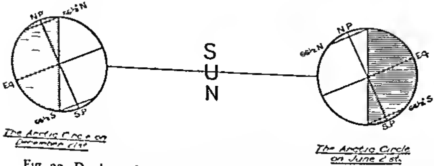


Fig. 32. Duplicated diagram (to be labelled by class) after globe and light demonstration.

since accuracy is essential, and the children's own inaccuracies of drawing often give rise to confusion in their learning The class could then write down in words all the information which the diagram presents, including the information that the sun is overhead at the Tropics, which they could name and number. The correspondence in degrees of the Tropics and the angle of tilt of the earth's axis can be emphasised, together with the fact that it is the tilt which presents the Tropic to the sun In this way the 'sun overhead' is presented as a fact which can be seen, in the most easily understood position of the earth in relation to the sun, a matter to be picked up later as need arises It should also be noted that the number of days in darkness or light increases towards the poles until the conditions known as six months' day and night occur at the poles themselves The work could be completed with a dictated definition, that owing to the inclination of the earth's axis, at 66½° N there is one day of the year (June 21st) on which the sun does not sink below the horizon, and one day of the year (December 22nd) on which it fails to appear above the horizon At any given date the conditions are reversed at 66½° S

A useful aid in teaching time zones is a timetable, such as the following, of the Canadian Pacific Railway transcontinental line showing the length in time and distance from Montreal to Vancouver

Miles	Route	Time	Day	Time Zone
0	Montreal dep	2 15 p m	Friday	Eastern Time
111	Ottawa	4 15 p m	„	„
437	Sudbury	12 01 a m	Saturday	„
985	Port Arthur	2 20 p m	„	„
1408	Winnipeg	10 20 p m	„	Central Time
1765	Regina	4 12 a m	Sunday	Mountain Time
2240	Calgary	1 30 p m	„	„
2322	Banff	4 05 p m	„	„
2631	Kamloops	2 35 a m	Monday	Pacific Time
2881	Vancouver arr	10 00 a m	„	„

Train The Canadian' Daily Time Montreal to Vancouver 70 hours 45 minutes

The timetable is simple to follow, but the column of time zones introduces an aspect of travel not met with in rail journeys in Britain It is convenient to present the class with a map showing the five time zones, as in Fig 33, on this the children insert the

route of the train from the timetable data. They are then asked at what longitudinal interval the time zones occur, and with what lines their boundaries coincide To discover the reasons for these facts they will need to recall that the earth rotates 360° in twenty-four hours, that is through 15° in one hour. Using the globe it is a simple matter to show that each zone rotates *eastwards into the light of the sun* earlier than the zone to its west, so that, for convenience, the time in the whole zone is accepted as being one hour behind that of the zone to the east of it Given that Zone I

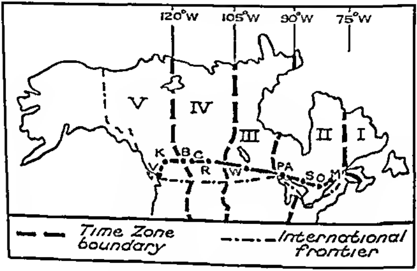


Fig 33 Canada Time zones

is the Atlantic Zone, children can readily name the others on their map from the timetable They gain practice in using the timetable and familiarity with time lines by answering questions such as 'When the train leaves Montreal at 2 15 p m. what is then the time in Port Arthur, Winnipeg, Regina and Kamloops respectively?' Or 'The time spent on the Montreal–Vancouver journey is given as 70 hours 45 minutes, yet from 2.15 p m on Friday till 10 a m on Monday is only 67 hours 45 minutes, account for this difference'. It should then be emphasised that all time zones are based on the time along the Greenwich meridian, as indeed are the standard times of all the countries in the world. Our limited longitudinal extent in Britain involves the use of only one standard time, that of Greenwich

This work can be continued when Asia is introduced, for air

routes crossing the Pacific Ocean are of particular interest A B O A C route from Britain runs from Hong Kong via Tokyo and Honolulu to San Francisco, and is shown on the timetable thus

	Monday
Hong Kong depart	19 00
Tokyo arrive	22 50
depart	23 50

INTERNATIONAL DATE LINE

	Monday
Honolulu arrive	12 20
depart	14 00
San Francisco arrive	21 45

This air timetable refers to a feature not found on any railway timetables, that is the International Date Line The Canadian railway journey showed that it is necessary to allow for the rotation of the earth by turning clocks back one hour for every 15° travelled westwards Similarly, travelling eastwards involves putting clocks forward one hour for every 15° Reference to a diagram (Fig 34) showing the earth's rotation and time will demonstrate how, because the earth rotates from west to east, lands east of Greenwich roll round into the sunlight earlier than those west of Greenwich Indeed, a trans Siberian railway timetable could provide concrete evidence of this fact The diagram provides opportunity for the class to work out that when it is noon at Greenwich, on Monday, if time is calculated westwards round the earth, at 180° W it is midnight on Sunday, but if time is calculated eastwards, at 180° E, which is the same meridian as 180° W, it is midnight on Monday Travellers crossing 180° meridian from westerely longitudes would find that Tuesday was just beginning although they had scarcely ended their Sunday Travellers crossing meridian 180° from the East would find Monday about to begin, although they themselves had already experienced Monday For people living in islands such as the Aleutians and Fiji through which meridian 180° passes this time factor could cause much confusion, so the International Date Line, the line agreed on for the change of date (or day) bends west and east of 180° to avoid cutting through any inhabited lands in the Pacific Ocean (Fig 34(b)) Given a duplicated map such as that in Fig 34(b), the class could add part of the

International Date Line from their atlas, and add the air route from Hong Kong to San Francisco They need to note that the words International Date Line are included in air and shipping timetables where necessary to remind travellers that they may

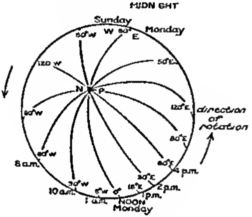


Fig 34(a) Earth's rotation and time

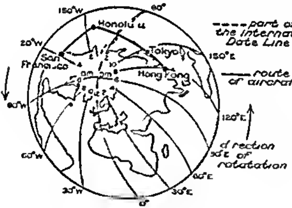


Fig 34(b) International date line.

either gain or lose a day. The class can then add a note to the effect that passengers on the aircraft from Hong Kong to San Francisco flying across the Pacific on the schedule given above benefit from an extra day, and therefore Monday is shown twice on the timetable This can also be expressed in the form that in flying eastwards round the globe travellers lose one hour of clock time for every 15° of longitude traversed. They regain it all at

once in the form of having the same day twice at the International Date Line

Since seasons, or lack of seasons, are phenomena of interest in all areas of the globe, they can be introduced logically when teaching any area Because understanding how seasons occur involves understanding all the basic facts of 'pure' mathematical geography (page 187) it is sound teaching to present opportunity for this understanding after all the basic facts have been learnt, so that their application is easier It is convenient, therefore, to explain how seasons occur, in the fourth year, after the climatic regions of Europe have been summarised This means, too, that those children who attend no further geography lessons after the fourth year will have completed the mathematical geography necessary for understanding human geography It will doubtless be necessary to introduce some revision in the fifth year course, but since the work has been completed, this revision can be short, an important consideration when time is pressing

Optimum teaching conditions are essentially those of a darkened room, with the use of a globe and source of light representing the sun The children should first be questioned to ensure that they are completely familiar with all the facts concerning the earth's rotation and revolution The globe should then be placed in the winter solstice position of December 21st, already familiar to the children from their third year work A diagram recording the conditions visible is then drawn on the left hand side of the blackboard For reasons of scale and clarity the sun should be represented by a large S or the word sun rather than by a large circle The rotating globe should then be taken round the source of light (in the path of the earth's orbit) to the position of vernal equinox (March 21st) Add to the blackboard a diagram representing these conditions (Fig 35) It is essential that the class realises that the blackboard is showing *on a vertical surface* what happens in a single horizontal plane and that it is only possible to draw circles representing hemispheres for the globe Thus the shaded circle on the diagram which represents the state of vernal equinox, represents that half of the globe which is away from the sun, the other half of the globe which faces the sun and is in light cannot be represented on the blackboard The children are already familiar with the concept of the equinoxes, so should not find it difficult to understand, they must note that owing to the position of the earth in its orbit the sun is now overhead at the equator Repeat the demonstration for the summer solstice, add

the third board diagram Complete the demonstration with the autumnal equinox, explaining that on the diagram the part of the globe not visible is that away from the sun and therefore in shadow It will be seen that the completed diagram illustrates actual conditions on four days only, each representative of a season It will further be evident that the sun is overhead at the

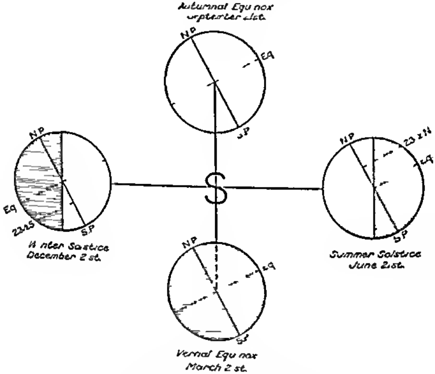


Fig 35 Completed blackboard diagram after globe and light demonstration of seasons

Tropic of Capricorn in December, at the Equator in March, at the Tropic of Cancer in June, and again at the Equator in September, although the sun itself has not moved The positional change of the earth occurs gradually, evolving a change of seasons gradually throughout the year It will be readily under stood that to observers on the earth it is the sun which appears to move, as it has appeared to move in the daily observations made by the children themselves The tropics have acquired their significance only because they mark the farthest north and farthest south apparent movement, and they occur at $23\frac{1}{2}°$ N

and S of the Equator in direct relation to the angle of tilt of the earth's axis, learnt as $23\frac{1}{2}°$ from the 'vertical' The movement of the earth causes the apparent movement of the sun This pheno menon is known as 'the apparent migration of the sun'

For those who prefer mechanical aids other than globe and light, or who wish to revise by means of a different approach, much of mathematical geography can be taught through films or filmstrip There are sound colour films entitled 'How we know the earth's shape' (10 minutes), 'The earth, its seasonal movement round the sun' (12 minutes), 'Latitude and longitude' ($8\frac{1}{2}$ minutes, also mute), 'Day and night' ($8\frac{1}{2}$ minutes), 'The round world and the sun's rays' (5 minutes) and 'Seasonal changes in the temperate regions' (9 minutes) There is a filmstrip in colour which accompanies the film 'Latitude and longi tude', but may also be used independently A black and white strip similarly supplements 'Day and night' There are also strips illustrating the seasons Two 8 mm cassette films entitled 'Night and day' and 'Summer and winter' are also available All this equipment is for hire from the Foundation Film Library, Brooklands House, Weybridge, Surrey For those interested in model making, Gopsill and Beesley's *Practical Geography* (Mac millan 1964) contains examples for use in mathematical geo graphy, including that of the globe and light which we advocate

Map Projections

If 'pure' mathematical geography is taught as part of the normal school geography course, in stages graded carefully through the syllabus, it should be comprehensible to all children with some knowledge of elementary geometry The problem of map projections is more complex The study of map projections is part of sixth form work, indeed, its exclusion from A level syllabuses may mean that it is not always included even for the sixth form Mathematically minded teachers enjoy teaching this aspect of geography, since it involves straightforward mathe matical exposition, but the non mathematically minded fight shy of it For the teacher the test is again, what is needed for geography? It is perfectly possible to learn school geography without a knowledge of map projections, for less able children the need for such knowledge does not arise Such children need only awareness of the fact that no map can give in every respect a true representation of the surface of the whole earth, or any

large portion of it. An attempt to wrap a piece of paper round the globe clearly demonstrates the inadequacies of a flat surface. Able children often wonder why atlas maps are dissimilar particularly in respect of straight or curved lines of latitude and longitude. If the need arises, some simple explanation should be given.

This explanation might well take the form of an exercise in which the children construct their own map graticule. On the globe measure 0° longitude from north pole to south pole, let this be drawn as a straight line in the centre of a piece of paper. Then measure on the globe the length of the equator. This will be twice as long as the first line. Draw this line bisecting 0° longitude at right angles, as the equator bisects the meridian 0° on the globe. The insertion of other meridians of the same length as 0° at intervals of 45° completes this simple graticule. The children can then note how this network of latitude and longitude lines differs from those on the globe, and how these differences affect land and sea areas on the map. They have drawn a cylindrical projection. Lesson time would probably be sufficient for a further exercise. For this graticule measure 0° longitude and the equator on the globe, and draw as before. Then measure on the globe the lengths of latitudes 60° N. and S., and 30° N. and S. Insert these lines to bisect meridian 0° at the correct intervals. When the equator and poles are joined, a projection similar to Sanson-Flamsteed's is seen (Fig. 36). The children can then note how this network differs from that of the globe, and how it affects shape and area. Reference to atlas maps of the world such as on Mercator's projection gives the children further practice in their observations that it is not possible to project the globe graticule on the map. The only further explanation necessary is that many mathematicians have tried to devise the most accurate

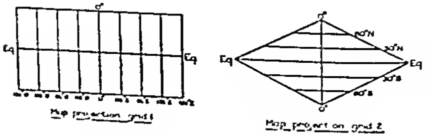


Fig. 36. Simple map projections.

representations possible, study of the atlas will identify many of these cartographers by name

Surveying

A brief account of the elements of surveying is commonly included in general geographical text books, though it is never required at O level, and not always at A level Clearly surveying is closely related to our subject The early explorers were also map makers, and a geographer who did not know the first principles of surveying would be ignorant indeed These first principles are nevertheless basically a part of mathematics, and pupils making a map with simple instruments are learning more applied mathematics than geography Exercises of this nature, involving measurements and calculations, either in the classroom or in the field, are commonly labelled 'practical geography', and this gives to beginners a misleading impression of the nature of the subject The real practical geography is the observation and recording done during field work, but we consider all work which involves purposeful activity to be practical work This recording is frequently done upon a base map, which was originally made by a surveyor Whilst not denying the close relationship of the two subjects, we suggest that practical surveying is better placed, so far as its educative role is concerned, under the aegis of mathematics If surveying and field work can be undertaken together, and an accurate map drawn so that further data can be recorded upon it, so much the better, but in practice the time taken by the former usually detracts from the latter, which is the geographer s main purpose

These borderline matters, which are frequent in geography, must be discussed by both subject specialists Here is one of the many cases in which geography is a good integrator of subjects Should simple surveying not be studied elsewhere, the geographer, if he can find the time, must include some such work in his course A most suitable and simple practical exercise which demonstrates the main principle is a plane table survey of a level area such as the playground The most primitive instruments give adequate results, indeed the simpler the instrument the less the learner is befogged by unnecessary technicalities Two pins stuck in a ruler make a workable alidade The only other apparatus needed is a table, paper, pencil and a measuring tape The principle of locating and mapping a distant point by measuring a base line and two angles is readily learnt The same principle

can be learnt by measuring angles from the end of a base line by means of a prismatic compass, but this is more elaborate, and involves extra arithmetical detail which obscures the main issue The compass traverse is another practical exercise which develops the same principle Although the inherent inaccuracies are greater, it produces a satisfying result for the beginner in a fairly short time

An acquaintance with the principle of levelling, to give some idea of how contours are mapped, is less essential but can well be included according to time and taste Any instrument which includes a bubble for levelling and means of sighting, together with a marked pole, can be used to produce a series of heights along a known line Indeed a simple level can be made using water in a U tube, or the ordinary commercial spirit-level can be adapted by the mechanically minded [6] A modern and simple system for measuring a stream valley by long profile and cross-section is given by Briault and Shave [7] This system also avoids the problem of separation already mentioned Although a principle of levelling is involved, the major purpose is to record the shape of a stream valley, and this can and should remain apparent throughout the exercise

All but the last of these exercises are fundamentally for pupils to understand the techniques involved A closer relationship to geographical subject matter is shown when a measurement, for instance of a slope, is made with a purpose in mind Elementary sixth form studies in physical geography may well involve a specific purpose, but it is more important for such pupils to recognise features first by eye than to discover them by instrument They should be trained to see, for example, a set of terraces, and to locate them on prepared maps, before becoming involved with the slower and more intricate process of measurement

Whether or not outdoor practical work is done, some brief classroom explanation of triangulation and surveying should be included in a school geography course The fourth year, or thereabouts, is a suitable time. The major principle of triangulation, working from one accurately measured base line, and the subsequent detailed breakdown, can be covered in one or two lessons The great developments in photogrammetry in recent years are better left until the sixth form The consideration of surveying leads conveniently to the work of the Ordance Survey in this country, and the co-ordination of its maps by the national grid system

STATISTICS

We have used the word statistics throughout this book in the popular sense of the word, namely of figures of production or other quantities Geography today is increasingly concerned with quantitative data The statistician analyses and processes such data In school we are concerned almost solely with their visual presentation In the upper school there is some consideration of the varying methods of mapping them It is only at research level that statistical techniques are needed, and in accord with current trends, undergraduate instruction in them is sometimes given

This means that school work in this field will be mainly concerned with the changing of figures to graphs, charts and diagrams, or the reading of such graphs, once made We suggest two principles First, there should be a graduated scheme so that the child progresses from the simplest forms to the more complicated, and second that he should learn by means of necessary examples which are part of a geography lesson, rather than by practising separate exercises

Perhaps the simplest visual presentation of figures is by the isotype or stylised symbol A given number of such symbols represents a certain quantity There is a straightforward visual image of relative proportions, and no problem of interpretation other than the quantity represented by one symbol Thus a dozen stylised bottles of milk opposite the word Cheshire or Somerset, or better still, on a county map of England can convey relative importance or be used as a recording exercise Children enjoy devising and drawing such symbols When they draw their own simple map from such data the interest aroused by their own discovery of the major facts concerned is considerable It is but a short step from this to a series of columns in proportion to the figures concerned Even here the degree of abstraction, particularly for the less able children, can be minimised The column can be readily changed to a sack of wheat by the addition of two 'ears' or to a barrel of oil by the conversion of the top to an ellipse The notion of a symbol as representing proportions has been established

The child s first formal plotting of data is often in connection with rainfall This is perfectly sound the column represents a given depth of water But let it be a diagram to show, say, the difference between the rainfall of Aberystwyth and Ipswich incidental to work on the British Isles rather than an abstract

exercise The preparation of the school weather record for exhibition also offers an occasion to learn a method It is a simple transition from a series of columns to a continuous graph to show temperatures Children may learn to draw graphs in other subjects, and their construction offers little difficulty to reasonably able eleven- or twelve year-olds It should be noted that the plotting of data against two co-ordinates is a technique required in section drawing The construction of a graph, being a simpler process, might well precede this in the syllabus and is best taught, first, by the mathematician The conventional graph of temperature and rainfall used to summarise a climate is a useful visual aid to memory provided, as indicated in the next chapter, a foundation of the realities behind the figures has been laid There are many more elaborate forms of column graph which can be introduced later Pairs of columns, columns going above and below a base line, and so on are described in the standard works

Most statistical diagrams other than the simple forms described involve some arithmetical calculation, and care must be taken that this calculation does not obscure the main issue The bar diagram which is divided into proportional sections, the whole bar representing one hundred per cent, or the circle diagram, often called a pie graph, are those most common below the sixth form The pie graph is useful to the geographer as it produces miniature figures which can be conveniently placed on a map Thus a revision lesson on British trade could start with the production of three or four such graphs which summarise the trade of our major ports Class discussion of the resulting visual data can follow

It is consistent with our conception of sixth form work that the handling of statistical data at that level should involve some conscious consideration by the pupils of the appropriateness of the methods used In most cases this will be in connection with mapping Some A level syllabuses include in their practical paper the mapping or other handling of statistical data Statistical techniques are not required Simple arithmetic and common sense consideration of what is suitable method is usually sufficient Thus a sixth former must have considered such problems as the uses and limitations of density shading compared with dot-mapping, or the difficulties involved in the construction of a flow diagram The sixth former, who is also doing mathematics, will clearly be more at ease handling statistical data The criterion for the non mathematical sixth former is what is required to

enable him to present numerical quantities in a form required by geographers.

This chapter has dealt with the teaching of four aspects of mathematical geography, that is work concerned with the effects of the earth's relation to the sun, surveying, map projections and statistics. It is clear that the last three are specialist studies, and that they are touched upon but briefly in the school geography course. Sixth form work, particularly that taught by a mathematically-minded geographer, might well expand them. For the majority of children, however, mathematical geography is that which helps them to understand human geography.

NOTES

1. Freeman, T. W. *A Hundred Years of Geography* Duckworth, 1961, p 141

2 International Geographical Union *Final Report of the Commission on the Teaching of Geography* Denoyer-Geppert, 1965, p 25

3. Garnett, O *Fundamentals in School Geography* Harrap, revised edition, 1960, pp. 96–125

4. Fairgrieve, J *Geography in School* University of London Press, 4th edition, 1937, Chapter XVIII

5 Jackson, C I *Some Climatological Grumbles—Pt I* Weather, September 1963, pp 278–282.

6 See e g Debenham, F 'A simple water level' *Geographical Journal* Vol 130, 1964, pp 528–530

7. Briault, E W. H and Shave, D W. *Geography in and out of School* Harrap, 1960, pp 48–52.

CHAPTER 11

CLIMATE

In the introduction to this group of chapters we have made it clear that the teaching of climate should not be a separate study in the early years of school Climate, of course, plays a large part in geography, and should receive ample attention in a school course In general it is probably wise to avoid direct teaching about climate, and certainly about climatic regions, until fairly late in school life, say the fourth or fifth form All previous work should be laying foundations for the more formal, codified knowledge of climate and climatic regions which will receive special study in the sixth form, though knowledge of the basic world patterns will have been established by the fifth year

These foundations should consist mainly of the study of local weathers During the second, third and fourth years, as suitable examples are encountered during regional studies, some codification of typical seasonal regimes can be made Also as appropriate examples present themselves, some elementary explanation must be attempted of the essential physical processes involved, such as insolation, condensation, and precipitation There are implications here for syllabus construction, and this theme will be resumed in chapter 14

Why should study of climatic regions come fairly late? The principle of working from the particular to the general is a sound justification Children think of specific examples before they can generalise Geographers also generalise only from particular data Climatic regions are a very generalised concept, and therefore should be dealt with at later stages, when children have acquired sufficient factual knowledge, and mental maturity, to make such generalisations

The point has already been made that the bulk of our geography teaching should be about places, and their climate is but one aspect of what children learn about them Children should study all aspects of a place, and it is desirable to postpone as long

as possible the somewhat artificial separation of the various elements concerned.

This was well expressed forty-three years ago by Rudmose Brown.[1] 'From the child's first geography lessons we get the impression (at least it is there if we look for it) that different parts of the world have different climatic and kindred conditions, and it may well be that the regional method is best learnt by progress from the particular to the general We gather again, at an early stage, that different parts of the world are hot or warm, cool or cold, wet or dry. But a regional method such as we have summarised, its divisions labelled with type names and numbers, is an advanced method, it is not an introduction to the subject of geography, and it is not its be all—it is, indeed, much more nearly its end-all It presents itself to us as the summit, not the base, of a secondary school course' This idea did not immediately find acceptance, indeed, it is not universally implemented today.

The explanation of its slow acceptance lies in the historical development of the subject, and although the situation has changed, there are considerable remnants of past attitudes left. These attitudes derive from the writings of Herbertson His pioneer work[2] at the turn of the century ranks him among the founders of modern geography. The impact of his natural regions, first expounded in 1904, is with us yet A modern geographer of equal calibre, Dudley Stamp, did much to foster and perpetuate his ideas In 1957 he said[3] 'When I came to write *The World* Herbertson's natural regions were so much a part of my thinking that they were included automatically' *The World* is now in its sixteenth edition This was a powerful influence, particularly as for many years it was a general text book used by many teachers, non-specialists who were not in a position to read more widely in the subject Many other texts also put great stress on exposition of the Herbertsonian regions, or variations of them Such expositions presented world regions as a factual picture to be learnt, rather than as an end product of geographical study. Although of fundamental importance in the development of geography, they caused in schools, at least in the early part of this century, and to a certain extent still, a too early classification and formal treatment of climate and world regions It was this treatment that led children to learn by heart such summaries as 'hot dry summers and warm wet winters' with little understanding of the realities of weather in the Mediterranean

There was also considerable formal explanation of world climatic regions, in terms of pressure belts, wind zones and their seasonal migrations Diagrams of the planetary winds, often shown as blowing in a similar way over the whole world, were learnt by heart in the first and second year, later applied to imaginary oblong continents, and the subsequent climatic regions derived There was a great deal of wrestling with explanations, often difficult and now of doubtful truth, which children learnt too early and often got muddled The following examination questions[4] set in 1922 and 1924, are indicative 'Describe the wind systems of the Atlantic between 10° N and 60° S and indicate the effects of the winds on the climatic conditions of the lands on either side' 'With reference to the map of Africa (which showed rainfall between May and October) (a) describe the distribution shown, (b) insert arrows to show the winds, (c) account for the distribution'

Fairgrieve attempted to change the picture In *Geography in School*[5] there is no chapter on the teaching of climate as such, but much passing mention of climate as part of man's environment There are three major references First he mentions[6] the various features that make climatic study real, for example that average temperature or rainfall figures mean little unless elaborated to include such detail as humidity, snow cover, rain days, wind strength, sunshine and cloud cover Secondly he writes[7] of the teaching of isotherms in terms of mapping techniques By constructing their own map the children develop both a necessary skill and an understanding of the facts His third and main section[8] is under the heading of home geography, where he discusses children's weather records Of pressure, he says, 'Leave until last, or not at all' Even in 1926, he directed attention to air movements and air masses, rather than winds Although air mass meteorology was then by no means developed, it was becoming clear that the way for children to look at climate was by considering air movements, rather than winds The present generation of geographers, brought up on air mass climatology, should find no difficulty here

A steady change in the approach to climate teaching is shown by further consideration of School Certificate and General Certificate of Education questions Not all required formal explanations '"All the phenomena that go to model the climate of a country are existent in the British Isles" Support this statement by examples' This question, set in 1927, suggests that children

should learn details of weather as well as climate It also requires them to organise and evaluate their factual knowledge, and one suspects that if set today there would be protests that it was too difficult. There was also a substantial movement towards integrating climatic study with regional work. Thus in 1932 candidates were asked to show how relief and climate affected farming in the British Isles, and in 1939 they were asked to relate the climate and resources of the Thames Basin or the Clyde Basin

This change was supported by research findings and examiners' reports. The isolated study of climatic regions, with details of winds and causal explanation, was found to be disliked and misunderstood This is evidenced in examiners' reports, which quote many examples of the type of misunderstanding which Fairgrieve[9] saw as the result of incorrect teaching 'Warm air rises and cold air rushes in to take its place.' 'The east of England is sheltered from excessive rain by the Welsh mountains' In 1939 Swainson[10] investigated the likes and dislikes in geography of elementary school children By far the highest scores in dislikes, with seniors aged 11–14 years, was physical geography, which included climate. The abler children disliked it more than the less able, and she suggested this was because more description and less explanation was given to the weaker pupils Phrases such as 'dry and boring', and 'hard to understand' were used In 1949, one of the writers,[11] investigating children's interests in geography, found even more marked results among grammar school children Climatic topics scored very low marks in their assessment of interest.

Post-war trends can be summarised as follows There has been less emphasis on explanation below the fifth form. There has been an increase in the number of related and applied climatic questions at O level There has been the introduction of specific weather detail and of the testing of mapping skills The offering of climatic data, with a request to identify the region, has for long been a popular and fair test of applied knowledge The most recent development of this idea is the production of other forms of climatic data for consideration, or of data which require an understanding of climatic regions for their interpretation Examples from University of London papers are 'What is a monsoon climate? Which area in Asia experiences one? Relate the agriculture of one such area to its climate' No explanation is required, but knowledge of facts and understanding of the part played by climate in the life of man is necessary (1947) 'Give

very suitable No instruments need be used The wind direction and the weather is all that need be noted In the square which represents the wind direction at the time of observation, the weather should be recorded A simple colour code, e g blue for rain, green for cold, red for warm, shows the relationship of wind and weather The rose for the month gives valuable results The variations of British wind direction is apparent, but the general tendency towards a predominance of wind from south westerly or westerly points usually emerges Simple correlations of rainfall with westerly winds, coldness with northerly or easterly ones, appear Such observations lead children towards thinking in terms of air masses, and for abler forms more detailed observations of daily weather, still without instruments, can be devised to this end For these, the wind force can be noted in terms of the Beaufort scale and its descriptive phrases, e g Scale 2, light breeze wind felt on face, leaves rustle, Scale 3, gentle breeze leaves and small twigs in constant motion, ordinary vane moved by wind, Scale 4, moderate breeze raises dust and loose paper, small branches are moved They can also begin cloud study From their own observations they can describe light feathery clouds, layers of cloud, and billowy cotton wool clouds, although the terms cirrus, stratus and cumulus may not be known to them Since variations of cloud associated with depressions are based on these three main types, familiarity with them at an early stage is an advantage

At secondary age, more formal methods of observation and recording are appropriate, and a school weather station should be established as part of the basis for this The equipping and siting of a weather station is straightforward, and to describe this here would be unnecessary repetition The most recent and convenient short description of how to set up such a weather station is given by Chandler in *The Geography of Greater London* [12] Further details are given in the *Handbook for Geography Teachers* [13] The various pamphlets published by Her Majesty's Stationery Office on meteorology, weather and allied topics should be specially noted For those not practically inclined, help and co-operation can be obtained from the science and handcraft staff

How should such a weather station be used? Much technical advice is given in the manuals on how to take readings and make recordings Their place in the school geography course has been perhaps less fully considered, and their use varies Enthusiasts make

elaborate records, and sometimes the mechanics of the recording obscure the more important consideration of the results Others find the running of the station an unwelcome chore and the Stevenson's screen remains mainly an object of interest for visitors The essential minimum would appear to be that which, at the end of a five year course, would give pupils a knowledge of the main instruments used, and experience at some time of a short period of recording Equally vital would be the necessity for an understanding of the relationship of what they have studied with the actual weather experienced, and with the daily weather report In the sixth form more detailed scientific study will be made according to the requirements of the syllabus If the interests of a particular teacher or pupil produce a more detailed study, so much the better Where graphic records of the weather of the whole or much of the year are produced, it is essential to incorporate them into the ordinary classroom work on the British Isles, where they can provide detail of climate They will also present comparisons of the weather of successive years, thus reinforcing the notion that average figures give by no means a real picture of specific weather They may even introduce the idea of climatic cycles Chandler's work[14] on the climate of London included the organisation of the Lea valley climatological survey, and the detailed weather studies made by schools under his guidance[15] show the quality of work which can be obtained from interested children

Formal observations of the daily maximum and minimum temperatures can be made in the second or third year, and the instruments themselves will be explained Again the main value lies in the end product The remarkable day to day variations of the British weather are seen A steady trend of rising or falling temperatures is usually shown at the end of two or three weeks Calculations made by the children enable them to realise that daily and monthly means are generalisations which seldom coincide with the actual facts at any given moment Rainfall observations can similarly be made at this time, but the results usually show little observable monthly pattern Detailed consideration of rainfall is probably better left until the fourth year, when the daily weather report, and the mechanics of depressions, may be introduced A pitfall might be noted It is easy to organise a roster of children per day or per week who, once started, plot away happily Unless reference is made to their results the rest of the class will learn little An intensive study, with several

children taking part each day, and a whole lesson devoted to the results at the end of a month, seems the best Longer-term projects could well be left to a school society

Weather observations should also be used to give children a yardstick by which to judge other climates Most know without further training what 32° F (0° C) feels like By direction and reference to convenient examples, further key temperatures can be learnt Considerable outdoor clothing is needed at 40° F (5° C),* and 60° F (15° C) is a common temperature of a British classroom Outdoors this is pleasant but not particularly warm save in still air 70° F (20° C) is considered hot in this country, and temperatures of 80° F (27° C) are usually recorded as a heatwave in the press A sense of reality should also be inculcated by observation of actual rainfalls In what to children is a rainy day in lowland England, only one or two tenths of an inch falls Only phenomenal summer thunderstorms produce one inch Such factual knowledge is a basis for the appreciation of climatic statistics of other countries

Another foundation which could be laid in the first or second year is a knowledge of air streams, by direct observation of their characteristics Names, at this early stage, are not necessarily learnt, and the teacher will wait until clear examples present themselves Children can experience and describe for themselves, without instruments, the fresh, gusty, cool north westerly winds of a polar maritime airstream, and the blue skies and showery weather which often accompany it The thin dry wind from the east which almost unnoticeably chills to the very marrow can be noted as polar continental air The muggy, misty weather of tropical maritime air with its low cloud and poor visibility, can also be readily identified The fourth main type of air is experienced rather less often in this country, and the teacher must watch for the appearance of tropical continental air during a fine summer

These and other possible observations of weather phenomena lead up to the study of the Daily Weather Report All secondary school leavers should have at least some acquaintance with it, and examination forms will study it in more detail as part of their O level syllabus It is available from the Meteorological Office at a special educational rate, and is excellent value for money 'Your Weather Service'[16] is also an invaluable guide The report should be regularly posted on a wall of the school

* Centigrade figures are approximated for convenience

somewhere public A corridor outside the geography room gives greater general publicity, but if it is inside the room there is more opportunity—and a reminder—for the teacher to use it

Before specific study is made in the fourth or fifth year, children should become aware of its existence, and passing references to it can be made in lower forms Children of all ages are nowadays aware of the existence of synoptic charts from the television weather service, and questions about them may well be put to the teacher long before the children are sufficiently mature to understand them properly They will certainly have more than a little preliminary understanding of weather maps when the time comes for more formal classroom treatment

Particular reference can be made occasionally when studying other countries 'Let us see what the temperature (or weather) is in New York'. The Daily Weather Report gives the previous day's temperatures and weather detail for much of the northern hemisphere Indeed, it is possible to organise readings and recordings from the Report for stations in North America on much the same lines as those indicated for our own country using the Stevenson screen and direct observation Weather maps from the southern hemisphere, for example, from Australian newspapers, are a fascinating extra item for more advanced classes From time to time, particularly when some striking weather event occurs, the observed facts can be related to the information on the published report The maps are cheap and expendable, and coloured chalking can select and indicate major features An area of high pressure can be shaded in, or a given conspicuous air stream indicated by heavy arrows A sense of continuity can also be built up over a period of days, by a series of maps on the classroom wall, again before detailed study is made A persistent anticyclone offers the simplest starting point Later, the teacher must spot in advance a developing low, and track its course across the British Isles for a few days

On the basis of the foregoing work on how to read the weather map can be undertaken The details of the symbols, of the construction of the weather map, of the origin and structure of depressions, and some account of air masses, are given in most text books and they require straightforward study It can be seen that the approach has so far been specific There is no reason why it should not continue Fig 38 suggests a method The way in which the forecaster works can be followed by the students From the actual weather observations, the fronts are plotted

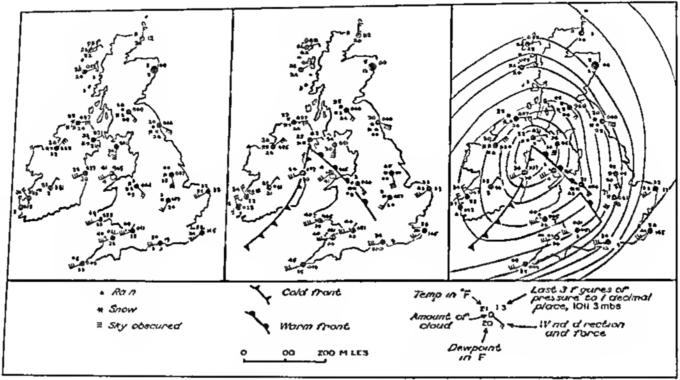


Fig 38 A depression: fronts and isobars

Later, the isobaric pattern can be discovered The warm and cold air streams also become apparent Further detail, using a cross section to show the upper air information, follows naturally A simple example has been taken, and the conventional diagram of the development of a cyclone, based on this, will have more reality than the diagram which is presented first, as an abstraction, and later applied to a real situation

This is about as far as it is possible to go short of sixth form work Simple examples will have been chosen, and more complex weather patterns will not have been mentioned The sixteen-year-old school leaver cannot be a complete meteorologist He will have, if the course has been successful, an understanding of weather, ability to read the symbols on a weather map and a modest knowledge of cyclones and anticyclones This is surely a firm base both for the A level course and for the ordinary citizen's reading of the weather forecast

We have so far considered mainly the development of an understanding of British weather, but some mention has been made of the use of local knowledge to give reality to the study of the climate of other lands As much local detail as possible should be used, before more formal summaries of climate are given The familiar temperature and rainfall graph of average monthly figures for a representative station is a convenient visual representation of a climate, but it is a final summary rather than an original piece of material for elucidation

Much use can be made of descriptive passages about other climates The relevant detail of the following, written by a geographer[17] for geography teachers, hardly needs elaboration

> We are happy in our house at 292 Waverley Street, Winnipeg It is a large three storey double fronted house with a basement It is centrally heated by steam piped in from a local factory and so we are always warm all over the house even if the temperature drops to 40° F below zero Even in November temperatures fall below zero, and so it will continue for four months There is not much snow, but it is very cold The car has to be specially winterised to stand the cold The oil must be of light variety in order to remain liquid The windows must be double so that breath does not freeze on and prevent visibility The engine must be heated by an electric heater fitted below the intake manifold The heater is plugged into a special plug in the garage or on the University wall Even the house has double windows and in very cold weather it is a mistake to light a fire because it roars away so fast that more heat is drawn out of the room up the chimney than is radiated into the room by

the fire Indoors we still wear summer clothes, but outdoors we look like Eskimos with quilted top coats and fur hoods The weather is usually dry, bright and sunny, and the snow is dazzling, but it can sometimes blow up a blizzard and then everyone stays indoors

It would provide an excellent starting point for almost any lesson on the Prairie Provinces, but it leads particularly to a study of them as an example of a continental climate

Another example of climatic material, referring to the Zambesi area, is given by Trewartha in *An Introduction to Weather and Climate* [18]

The winter months, or dry season, extend, with a slight variation, from April to November They are pleasant and healthy in the extreme Now the traveller and hunter of big game make their appearance, the deciduous trees are leafless, the grasses dry, yellow, and ready for the chance spark or deliberate act which, with the aid of a steady breeze, will turn vast expanses of golden grasslands into so many hideous, bare deserts of heat tremulous black All nature seems to be at a standstill, hibernating The rivers are low Where, but a few short months since, wide, watery expanses rushed headlong toward the sea there now remain but tranquil, placid channels, flowing at the bottom of steep, cliff like banks

With October the heat becomes very great Vast belts of yellowish clouds, with rounded extremities, begin to gather and at the close of day are seen to be flickering with a menacing tremor of constant lightning This may go on for a week or more, until Nature looses the long pent up voice of the thunder and the irresistible torrents of the early rains The first storm may come at evening and is a soul moving display of natural force

After such a disturbance, rain is fairly continuous for some time, and the effect of this makes itself felt in every branch of animal and vegetable life Within a few days the change is startling, the paths and roadways choke themselves with a rich clothing of newly sprung grasses, whilst the trees now leap into leaf and blossom The mosses, which for months past have looked like dry, bedraggled, colourless rags, regain once more their vivid, tender green Now the forest throws off its puritanical greyness and, with an activity and rapidity beyond belief, decks itself in flowers of a thousand gorgeous shades of colour

The months succeed each other, for summer is now at its height, and trees and flowers at their most perfect period April comes, and suddenly Nature holds her hand The swollen rivers and inundated plains shake themselves free from the redundant waters The grasses have now reached a formidable height The rains

cease, and the land begins to dry up Rich greens turn to copper, and brown, and yellow and little by little, with the advent of May, the winter returns with its sober greyness

It offers possibilities for related study of weather, seasonal regime, and vegetation for a tropical summer-rain region It lends itself easily to a circular diagram The addition of the rainfall and temperature figures of an appropriate station comes after full appreciation of the vivid description, thus serving to show how such statistics give but a skeletal picture of reality The influence of climate on man's activities is shown in the detail of agriculture, which can be added in the centre sectors of the chart

There are many pictures which can help the teaching of climate, and they are mainly those which show a striking human or vegetation feature Plate XI, a common scene in the lower Rhone valley, with its windbreak of cypress on the northern side protecting the vegetables, and the farmhouse facing south, shows at least some influence of the Mistral Frame 25 of the Common Ground filmstrip, 'Norway', is of a fiord The snow clad land, and the unfrozen water, are representative With careful classroom questioning, we can show children what is virtually a picture of the 0° C isotherm The seasonal pair of pictures are of great value in climate teaching Pictures from the same viewpoint in the wet and dry season, for example in tropical Africa, immediately pose a question to which the answer lies in the rainfall regime and its explanation Plates III and IV, which face south, show a simple contrast In this case, an additional point is illustrated The length and angle of the house shadows in the foreground can be used to demonstrate the higher angle of the sun, and its more north-westerly position, in summer

There are many other local details which help to make real the weather and climates of other countries Clothing, or the absence of it, is an obvious example Much detail in house types can be related to climatic influences, but care must be taken not to produce a crudely deterministic impression It is tempting to follow the changing angle of roof from Norway through France and Italy to North Africa, but social geographers insist that cultural influences as well as climatic are present Nevertheless the facts about buildings exist, and can be used with caution The tiled floors, scanty heating, and ample shade of Spanish or Italian houses are at least related to the Mediterranean climate,

and the splashing, cool fountain in the courtyard of the traditional Moroccan house is more than an ornament Nowadays, air-conditioned offices and factories in the tropics offer a striking contrast to the conditions outside, and are an inducement to the labour supply The elaborate heating arrangements of cold lands, the double glazing and tiled stoves of Central Europe, the stories of sleeping on the stove in Russian folk lore, and the constant reference to the furnace man in American literature all help to make the continental winter real for children Useful class exercises are the drawing of house diagrams or sketches, with the features showing climatic response labelled

We must now consider the problem of explanations, and there are difficulties Fundamentally much of the explanation of temperature, rainfall, pressure, and winds is a matter of physics, and could quite properly be included in the school physics syllabus Unfortunately the place of a given item in the geography and the physics syllabus seldom seems to coincide, and not all children do both subjects Personal staff room liaison is important here, but exact coincidence in the two syllabuses cannot often be arranged The geography teacher must therefore usually take on the task himself At least here is a good opportunity to demonstrate the relationship of the two subjects A distinguished climatologist once said 'Physics is a tool of geography If you can't do physics, you can't do geography' For some teachers this is a severe criterion, and to implement it would certainly curtail the supply of geographers An attempt to teach necessary explanations must be made, and there is at each age level a limit to the depth of explanation possible

A second difficulty is that complete continuous treatment of these matters, carried out as a series of lessons over a term or more, divorces the content from geography It would become much more nearly a physics course Such detailed work has its place in the sixth form when specialist study of systematic items can be made Below this level, the work should be integrated as closely as possible with the study of places It follows that study and explanation of the various phenomena should be undertaken as examples occur, and the depth of study will be adjusted to the level of the class Topics necessarily mentioned during the first and second years, in an elementary form, may require more detailed treatment during fifth year revision From the third year onwards, this is usually unnecessary

We take temperature first The difference in the heating effect

of the sun's rays at different angles can be introduced quite early, and there is no need for it to be isolated Lessons on life in an equatorial land, and in a cold land, are commonly given at age eleven A simple consideration of insolation can follow, as part of the explanation of the major differences discovered, or may be left until year two This is only one part of the story, though a large one (page 192). Further detail about the atmospheric layer would be too much at this stage, and should be added later It could conveniently be introduced in the second or third year, when a mountain environment is studied Here is an opportunity to consider the atmosphere in detail The facts must come first the power of the sun in the thin air, the sharp contrast between the sun and shade or day and night temperatures and the shortage of breath and need for oxygen at high altitudes Explanations of the changing density of the air, the function of a barometer as an altimeter, and of the contrasts in temperature, follow naturally The other fundamental of climate, so far as temperature is concerned, is the differential heating of land and water, needed for the explanation of continental and maritime climates An example of the factual detail has already been given (page 219) Full understanding depends on a knowledge of specific heat, and here is an instance of a convenient working boundary between physics and geography The geography teacher can offer the statement that land masses behave in a different way from water bodies, so far as the absorption and release of heat is concerned More than this is beyond his province He is concerned with the climatic effects which follow from these properties, and can confine his efforts to leading the class to understand them Third year pupils and North America offer the occasion

Rainfall similarly could involve much detailed physical study, and simplifications adjusted to the age and ability of the children must be devised The full details of the complex processes involved in air expansion and cooling and in condensation and precipitation are pure physics, and in any case sixth form work or beyond Shortened versions must therefore be put forward in the early stages, which are correct as far as they go, and which do not sow the seeds of false ideas

The starting point is the idea of lifting When moist air is raised, by various means rain falls Traditionally the simplest example of this is relief rain Young children will accept the shortest explanation, that when air rises it becomes cooler,

and that cooler air can hold less moisture On this basis, relief rainfall can be satisfactorily considered The greater detail on saturation and condensation can be left until later, say the third or fourth year Even with this degree of simplicity, such erudities as 'The clouds burst and rain falls' should not appear A diagram or section will have been drawn to show air rising over high ground Frontal rain also occurs through the raising of moist air, and the diagram showing winds and a hillside with a minimum of alteration shows moist air rising over a mass of colder air At this degree of simplicity there is no reason why young children should not be introduced to the idea of frontal rain Conventional rain as a somewhat different form of rising air, can be left until last Again these matters should be considered in real situations, for example as an explanation of the greater rainfall of Wales compared with that of East Anglia, during early work on the British Isles Logically the problem of why there is rainfall in East Anglia, although little marked relief, leads to a mention of frontal rain, though children seldom raise this point themselves The conventional lesson on relief rain does not appear to give rise to the question 'There are no hills round here, and yet we have rain Why?'

The question of the relation of winds to pressure we leave until last The full picture involves a knowledge of the upper atmosphere, and is a matter of advanced meteorology not yet fully investigated Any simplified explanations should be used with great caution For the school geographer below the sixth form it is probably best to think in terms of great air movements, and their climatic effects A repertoire of the major surface phenomena will be built up during the five year course Such fundamentals as the steady movement of air towards the equatorial zone, the descending air of the desert belt, the winter air masses over the northern continents and monsoonal reversals, can hardly be omitted Their co-ordination and explanation should be left until sixth form studies, or confined to those of the fifth year

It is vitally important that whatever knowledge of climate has been obtained, it should be co-ordinated in the last year at school in the form of a world review of major regions As was pointed out at the opening of this chapter, such a co-ordinated picture is one of the essential ends of a school course There should have been planned progress towards this goal during the previous years By the end of the second year, if the southern continents have

been studied, the broad outlines of the pattern of equatorial, summer-rain and desert lands will be known During the third year, perhaps during the study of North America, a first division of a continent into regions may have been attempted Certainly acquaintance will have been made with climatic zones of temperate lands During the fourth and fifth years, further details will be added Indeed, if Europe is studied in the fourth year, it will be possible to consider the climatic regions near the beginning of the course The children will have previous knowledge of arctic or sub boreal, north west maritime, mediterranean and continental climates, so that they can proceed naturally from the particular details of these different climates to generalisations applied to Europe The work of co-ordination suggested for the fifth year is in one sense new and in another an essential revision of world knowledge

The ground covered so far is little more than the minimum requirements of Ordinary level work, but it also suggests the basic knowledge with which all but the weakest should leave school, namely some acquaintance with our weather maps, and some realisation of the elementary world climatic pattern The higher quality of Advanced level work in this field offers an opportunity to consider the different approach required

It has already been implied that a knowledge of British weather should form the basis of the study of British climate It is easy for the work on these two subjects to become separated Pupils should be kept aware, as far as possible, that their summary notes on the climate of Britain are generalisations which are, in reality, the averages of the day to day vagaries of British weather In the sixth form, a clear understanding of the relationship is vital, as the following questions show '' Study of daily weather charts *is* essential *to the* understanding of *British* climate " Discuss this statement '[19] ' "Man reads of climatic means, but suffers climatic extremes " Discuss and illustrate this statement '[20]

The reports of A level examiners[21] may serve to throw light on difficulties found by sixth formers in this aspect of their work 'Climate is an integral part of geography, but there is every indication that it is being neglected It is surely not expecting overmuch at this level for the candidate to be able to describe the process of uplift, cooling through expansion, condensation of water droplets around nuclei and their combination to form rain drops Most thought that rain started as soon as there was condensation, one glance out of the examination room window at the clouds

might have shown the error in this   The simple physical principles underlying evaporation and condensation leading to precipitation eluded most candidates' In a later year, the examiners found it necessary to give further detail to help future candidates 'Condensation involves cooling, the temperature of the air falls below that of dew point, and the water vapour in the atmosphere condenses out to form minute water droplets visible as cloud Precipitation, on the other hand, is something which occurs after condensation, and involves the growth of water droplets around a nucleus until such time as the raindrop is heavy enough to fall Depending on temperature, precipitation will either be as a liquid, rain or a solid, snow if the dewpoint is below freezing, hail if the initial condensation is in liquid form and later freezes' The examiners also suggest that for a question concerning cloud types associated with depressions 'The simplest approach is to divide the depression into warm front (cirrus, cirrostratus, altostratus), warm sector (e g fair weather cumulus), cold front (cumulus, cumulo nimbus) and cold sector (e g cumulus)' Reports also state 'There were some very extraordinary ideas as to how rainfall means were arrived at, arising basically from a failure to appreciate what an arithmetic average is' The word regime gives trouble The incidence of rain throughout the year does not mean rainfall types'

The knowledge of world climates gained in the fifth form will be elementary, and the sixth form course will certainly need to review the main regions in more detail There will also be need for a considerable change in outlook The majority of pupils, until this stage, have neither the knowledge nor the maturity to query the validity of the regions In the sixth, they must become aware that climatic boundaries—and indeed many others—are by no means rigid They will be expected to examine these boundaries critically, and debate their authenticity Here is an excellent chance for them to use geographical facts to justify their ideas The following questions, all set in Advanced level geography papers in June 1962, illustrate the point 'Examine the difficulties of defining climatic boundaries' 'Make a reasoned climatic division of the tropical areas of the world' 'Outline and justify a division of any one continent into climatic regions' '"Latitude and continentality are the main factors determining the climatic pattern of the world" Comment on this statement and illustrate your answer with varied examples'

As with other systematic studies in the sixth, we must beware

of considering them *in vacuo* The discussion of the various possible climatic divisions is a fascinating problem for developing minds, but care should be taken that the patterns discussed do not become intellectual abstractions The relationship of climate to vegetation and agriculture is an obvious and important link with reality The following question reminds us of this, and of the development of applied geography 'If you had to report on the agricultural potential of a tropical area, what climatic data would you hope to have available?'[22]

The examiners' report 'throughout the examination a failure to quote when appropriate elementary statistical data pertaining to the elements of climate Climate is not solely a matter of statistics but the appropriate mean annual total and seasonal distribution of rainfall and the seasonally characteristic temperatures for each of the major climatic types should be known At A level there is no excuse for unqualified references to "warm", "dry", "cool' or "wet" climates—least of all to "excessive" or "adequate" rainfalls and temperatures—such terms have no meaning . A number clearly knew the textbook relationship between relief and rainfall but failed absolutely to apply their knowledge . Many candidates found difficulty in describing the main features of the climate of each station This was a test of the candidate's ability to reason from facts in front of him It separated out those who have a real grasp of the fundamentals of climate from those who merely learn by heart'

Climatology and meteorology is a well documented field, but the following articles in *Geography* offer teaching hints, and illustrate the development of the teaching of these subjects in our schools It is significant that several appeared in the immediate post-war period, when the publication of the Daily Weather Report recommenced after its withdrawal as part of war-time security An early emphasis on this aspect of school work was contributed by Lebon's 'The interpretation of the Daily Weather Report' (Vol XXXII, 1947, pp 53–66) 'Local climatic studies for schools' by Balchin (Vol XXXII, 1948, pp 128–136) contains the basis of many of the ideas given here 'The cold spell January-March 1947' by Cornish (Vol XXXII, 1947, pp 67–76) reminds us that a striking climatic event affords useful and interesting specific material for study, whilst 'The study of diurnal temperature changes' by Garnett (Vol XXVII, 1952, pp 24–32) gives suggestions for the study of local detail A valuable summary of air masses is given in 'Air mass climatology'

(Vol XXXVIII, 1953, pp 55–67) by Austin Miller, and, of course, in other more detailed works A full description of how to use the facts offered by the Daily Weather Report is given by Prudden in 'Classroom work on the Daily Weather Report' (Vol XXXIX, 1954, pp 181–191). More recently, academic studies have been directed towards the overall picture of world atmospheric circulation, and much of this is beyond the scope, at present at any rate, of sixth forms The concept of vorticity has not yet reached their geography texts [23]

NOTES

1 Rudmose Brown, R N, Howarth, O J R and McFarlane, J *The Scope of School Geography* Oxford, 1922, p 57

2 Herbertson, A J 'The major natural regions, an essay in systematic geography,' a paper read to R.G S on February 29, 1904, published *Geographical Journal*, Vol 25, 1905, pp 300–312

3 Dudley Stamp, L. 'Major natural regions Herbertson after 50 Years' *Geography*, Vol. XLII, Nov 1957, pp 201–216

4 University of London, Matriculation Geography papers 1922 and 1924

5 Fairgrieve, J *Geography in School* University of London Press, 1926

6 *ibid*, pp 44–48

7 *ibid*, pp 104–105

8 *ibid*, pp 259–268

9 *ibid*, pp 23–25

10 Swainson, B M 'An inquiry into likes and dislikes of elementary school children in geography' *Geography*, Vol XXIV, 1939 pp 109–125

11 Long, M 'An investigation into the relationship between interest in and knowledge of school geography' M A., London, 1949

12 Chandler, T J 'Climatological work in London schools' in *Geography of Greater London* George Philip and Son Ltd, 1964, pp 253–260

13 *Handbook for Geography Teachers* Methuen, 1964, pp 80–83

14 Chandler, T J 'The changing form of London's heat island' *Geography*, Vol XLVI, 1961, pp 295–307

15 Carr Gregg, R H 'Meteorology and climatology in Schools' *Geography*, Vol XLVI, 1961, pp 307–314

16 H M S O

17 Scarfe, N V

18 Published McGraw Hill, 1943, adapted from pp 351–352

19 University of Cambridge Local Examinations Syndicate G C.E Advanced Level Geography, June 1962

20 Associated Examining Board G C.E Advanced Level Geography, Summer 1962

21 University of London School Examinations Council Subject Reports 1960–64

22 Oxford and Cambridge Schools Examinations Board G C.E. Advanced Level Geography, 1962

23 Crowe, P R. 'The geographer and the atmosphere' *I.B G Transactions*, 1965 pp 1–19

LESSON 15

YEAR FOUR · EUROPE (NORWAY)*

(This lesson is an example of non-oral teaching)

AIM To discover how climate affects farming activities in Norway

MATERIALS REQUIRED

(i) Atlases

(ii) Individual copies of diagram (Fig 39) and question sheet

METHOD

Class study data given and complete exercises, writing answers as complete sentences

Question sheet

Mundal Farm, West Norway

The farm consists of 140 acres stretching from the Mundal River up the steep valley sides 40 acres of land is used for growing oats, barley, turnips and potatoes each year Of the remainder, 45 acres consists of permanent pasture, and 55 acres of rotation grasses The rotation is spread over seven years, four of grass growing, two of root crops and one of oats Anders Mundal, the farmer, owns sixty or seventy acres of grazing land or 'saeter' land a couple of miles away and at a height of 1,800 feet above sea level These are used for animals from May to the end of September

Use the information above, and the diagram, to answer the following questions

1 *The weather*

How many months show snow cover? What is the average depth of snow during these months? When is the snow deepest? How low do temperatures fall at this time? List the months when both maximum and minimum temperatures are nearly always below freezing point Which months show the greatest contrasts between maximum and minimum temperatures? Up to which month of the year might frost occur? When is the highest temperature recorded? What is it? If 43° F is taken as the temperature below which plants cease to grow in these latitudes, what months form the growing season?

* This lesson on climate has been kindly contributed by Mrs J Alen B A Head of Geography Dept Whitelands College

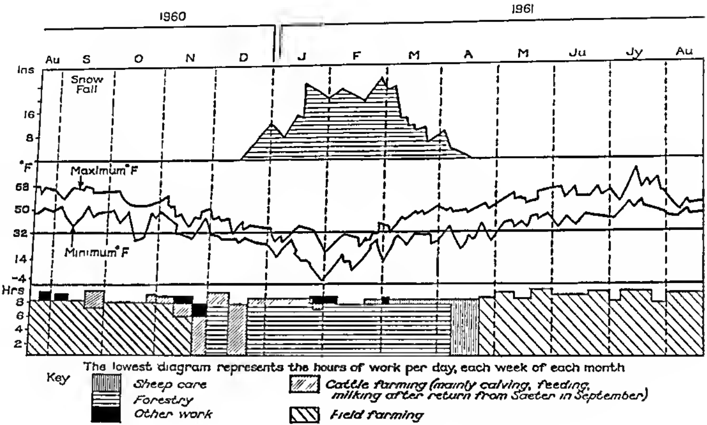


Fig. 39. Seasonal routines on Mundal farm, West Norway.

2 *Farming*

What crops are grown? Is the farm more concerned with crop-production or animal products? For how many months can the farmer work out-of doors? Why does the chart show no mention of animals from May to September? What is the most likely field occupation after September?

3 *Winter occupations*

With what activity is the farmer concerned from late December to mid April? Use the chart to explain this change of occupation Add anything else you may know or can find in your text book about this work

4 *There are many farms like this in Norway*

Using your atlas and text book, write a paragraph to describe the location of the main arable areas of Norway, giving reasons why they are limited

Give your work a title 'How climate affects farming activities in Norway'

LESSON 16

YEAR FOUR EUROPE (RIVER RHINE—PART OF LESSON)*

This exercise was originally devised for a field class working in the Rhine Valley in May It is given here as an example of work on climate suitable for a fourth form studying the Rhine Valley in class It forms part of a regional lesson on the Rhine Valley

Study the diagrams (Fig 40) and complete the section below

The diagrams show that the Rhine Valley has a specially favoured climate Since apple blossom is in bloom there than elsewhere in Germany, the season of spring must arrive in the valley than elsewhere

* This lesson on climate has been kindly contributed by Mrs J Alen B A, Head of Geography Dept, Whitelands College

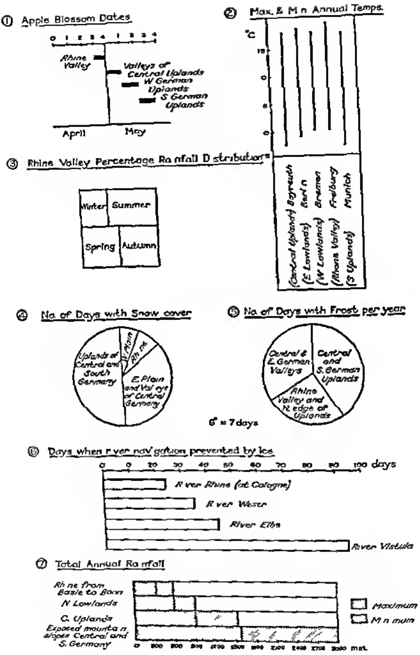


Fig 40 Climatic data Germany

By midsummer, temperatures have risen here than elsewhere It is at this season that the valley receives its percentage of total rainfall This would suggest that much of the rain may fall in the form of rain, resulting from the rapid rise of warm air currents The very temperatures suggest that the steep-sided valley acts as a for the sun, and keeps out winds *from* the

The winter is essentially and This is shown by

(i) the fact that minimum temperature is here than anywhere else except ,
(ii) the fact that the Rhine Valley has days of snow-cover,
(iii) the fact that the Rhine itself is frozen at Cologne for a period than any other German river,
(iv) the fact that the valley has days with frost,
(v) and the fact that its total rainfall is than elsewhere

That the weather is so mild can be attributed to the geographical position of the valley in West Germany, and therefore relatively near the moderating influences of the The fact that it is both and than the west North German Plain is explained by the surrounding the valley which will obviously reduce the number of winds reaching the valley and will place it in a partial

CHAPTER 12

LANDFORMS

THE major part of physical geography in school, other than climate, concerns landforms The principles of teaching these are, of course, the same A basis of fact should be laid before explanations are attempted This statement needs to be stressed, since 'In spite of an enormous and ever-increasing literature, there are few, if any, landforms the origins of which are known with certainty The generally accepted theory is usually only accepted because it explains a larger proportion of observed facts than its rivals '[1] The story of the development of this branch of the subject, which in some degree explains the present situation in schools, shows certain parallels with that of climate, but the timing is different

The pioneer work in the nineteenth century of Geikie in geology and Huxley in physiography established these subjects Huxley's treatise on 'Physiography', which appeared in 1887, was really an account of the physical geography of the Thames Basin, in which the influence of natural phenomena upon human life was disregarded Other aspects of geography then studied—such as they were—tended to be called political geography The rebirth of the subject in this country, which followed Scott Keltie's Report[2] on the whole united these two divisions In the early part of this century, the requirements of the syllabus concerning physical geography, though primitive, ensured its integration with other aspects The Matriculation Regulations of London University in 1908, for example, required the study of certain areas, particularly the British Isles, and continued 'Attention should be devoted to the following aspects of the several regions The broad contrasts and chief features of the land relief The chief features of the coastal outline as related to those of relief The disposition of the waterpartings and the chief river basins' Study of the questions in Matriculation and the later General School Certificate shows the continuation of an integrated approach until the late thirties The following question, set by

Taylor[3] in 1922, is representative 'Compare the shorelands of Holland and Norway in respect of (a) physical features, (b) occupations'

We have shown the powerful influence of Herbertson upon the teaching of climate There was a comparable influence by W. M Davis upon the teaching of landforms, but Davis was an American and he wrote later. *The Geographical Cycle* was first published in 1899, but his main *Geographical Essays* did not appear until 1909 It was not until the twenties and thirties that landform teaching based upon the cycle of erosion, and structure, process and stage really dominated British school work *Landforms and Life*,[4] with a section devoted to the geographical cycle and direct reference to Davis, is an example of a school text of the thirties Still today, although being increasingly modified, 'it provides a comprehensive geomorphological scheme which can be dissected and discussed in its more important parts it provides a framework in which the significance of the processes which are to be discussed in more detail can be seen'[5] As with Herbertson, the importance of the ideas resulted in an exaggerated impact in schools What was a convenient means of arranging the facts became the only means, and what was partly at least theory became taught as unalterable truth

The most recent stage is the remarkable post-war expansion of geomorphological studies in British universities Earlier pioneer study by such leaders as Wooldridge and Linton, expounded in works such as *Structure, Surface and Drainage in South East England* (Philip 1939), has now extended into a flood of research Steel's review of research articles published in the Transactions of the Institute of British Geographers (page 20) gives 23 per cent dealing with geomorphology, a larger percentage than for any other aspect of geography Slopes, denudation chronology, erosion surfaces and periglacial phenomena are phrases constantly encountered in geographical journals Davis's views are being reconsidered Typical is Dury's statement 'W M Davis appears chiefly responsible for the view that capture makes beheaded streams underfit The object of this paper is to direct attention to Davis's own misgivings about and to re examine the evidence on which that hypothesis was originally based'[6] This development has had a peripheral effect on the subject in schools, particularly at sixth form level There are now few A level syllabuses which do not require substantial understanding of landforms The borderline between school and

university study is here an uneasy one The report of the sixth form Overlap Committee (page 324) makes this clear We dare summarise a large body of discussion in the phrase 'too much theory too early' The A level candidate may hear of Penck, the scholarship candidate will Neither should be asked to debate the validity of his ideas

It follows from what has been said (pages 21 and 31) that we do not support with any enthusiasm the organisation below the sixth form of the teaching of physical geography into a markedly separate part of the syllabus The development of geomorphology has, quite properly, fostered this separation in advanced studies It also appears to be responsible for post-war signs of split in the geography of lower forms The arrangement of some O level syllabuses into separate sections of physical and regional geography is another powerful influence If examination questions are arranged in such separate sections, teachers tend to organise their candidates' work similarly Such questions as the following have been common in O level papers for many years 'With the aid of diagrams, describe and account for the formation of three of a crater lake, a delta, a ria, a river terrace, a waterfall'

Signs of change are visible, for example, the University of London reorganised and unified its syllabus in 1964 This unity has been debated on the subject panels of the C S E boards, not all have adopted integration A new style of question, advocated for C S E, which places landform study in its regional context, is as follows 'Read the following passage which describes part of the English Lake District and then answer the questions

'As we stood on the fells above Grasmere we could see the main valley, which looked as if some giant had run his finger across the landscape, scooping out a great trough The flat floor was patterned with a patch work of fields which disappeared abruptly on the rising slopes of the steep valley sides The eastern flanks were dark with forest, above which the slopes eased off giving way to open moorland In the distance the long, narrow stretch of Thirlmere, sparkling in the sun, appeared to fill the valley At our feet lay Grasmere, cradled on three sides by hills, with the fourth side opening on to the farmlands surrounding the village"

(a) Make a list of the main physical features of the area (b) Draw a cross-section of the valley (c) To what does the valley owe its present form? (d) What evidence is there in the passage

to justify your answer to (c)? (e) Name the kinds of land use mentioned (f) Name another area in the British Isles where such a view could be seen'

The existence of systematic geography, both as specialist studies and as examination matter, has produced a supply of school texts upon it As we have shown in chapter 6, text books manifest the author's conception of the subject and how it should be taught in school Texts on the systematic branches are commonly entitled 'General Geography', 'Principles of Geography' and so on The problem is at what level they should be used in school There is a case for the organisation and codification of knowledge of landforms and the processes which produce them towards the end of the five year course Often these books are justified with phrases such as 'to make clear general principles' or 'to provide a firm basis for the study of the subject' We can only say that to offer principles as introductory matter for the early years of school work indicates a view of the nature of geography and its function in education with which we disagree

It is against this historical background and present situation that we make the following suggestions We saw as the essential preliminary of climate teaching the laying of a foundation of facts about weather A similar process should be followed in the teaching of landforms In the early years a repertoire of factual information should be built up, as a basis for the more co ordinated and explanatory work of the later ones Reference to page 290 shows that broadly this more co ordinated work begins in the fourth year A picture of the first year foundation is given in chapter 13, and the importance of simple early field work by means of local studies has been mentioned in chapter 8 Here, then, we first consider these foundations and local study in more detail

There is no doubt that simple physical phenomena are less readily available in heavily built up areas The starting point for young children is the sticky clay soil or the sandy loam, the rain beating on the bare land, the gully in the path, the deposited sediment and the muddy water in the stream All these are plain to see—in the country They are also proper matter for primary schools, but these and other similar elementary facts and processes are interesting subjects for eleven year olds and of course should be studied in the locality if visible Asphalt playgrounds and streets without any gardens certainly prevent this kind of local work, but still some opportunities may arise The digging of

foundations usually reveals bedrock and a soil section, and almost any piece of open land can show erosion after a severe storm Normally the town school will need to make a short excursion to the nearest open space to study this material, and it can form excellent subject matter for a first organised half day trip away from the school Page 156 gives an example on Hampstead Heath The pioneers of geography teaching saw the value of such excursions, and the early numbers of *The Geography Teacher* contain many reports of their work in physical geography (page 122)

There is fortunately ample scope during the first year for the building up of vocabulary and of elementary concepts inside class River basin, watershed, tributary, confluence are but one set of terms which can be learnt as the local area or region is studied Again the subject matter will vary according to position A child in Totnes or Okehampton will hear of tors and granite long before one in Buxton In turn the northern child will first know of plateaux, gorges and limestone This idea has been implemented in detail in the syllabus given on pages 289 to 293 The rich scenery of the British Isles makes it easy to select a variety of elementary examples from the homeland to begin with, and the teacher has the rest of the world at his disposal to complete the process The principle of cross reference and revision might be repeated here, thus by the fifth year the pupil will have heard of fold mountains and glaciation, and be beginning to form in his mind a pattern of world distribution of fold mountains or of the general effects of glaciation

The place of maps in the study of landforms is vital 'The ideal way to study landforms and life is face to face For schools—and for most of us—such perfection is impossible, except to a very limited degree The next best way is by looking behind the finest topographical maps available'[7] Although the use of maps permeates every aspect of geography, physical studies suffer most when the topographical map is neglected This is clearly seen from the very start Contour lines are sometimes introduced too early, as an abstract mathematical concept. This is not necessary, and plenty of map work can be done in the first year without a knowledge of contours But sooner or later, during the first year, the understanding of contour lines must be attempted, and this means that the study of landforms has inevitably begun The local hill or valley is seen for the first time accurately portrayed, and the notion of slope—so vital to advanced physical

studies—has appeared Here, even in built-up areas, examples can be seen in the field Fig 41 shows such an example which we do not develop in detail From a series of spot heights the contour pattern can be mapped, and the form of the river valley appears It is very apparent on the ground, and an exercise can be devised whereby the direction of running water in the gutters can emphasise the direction of slope, and the position of the stream (now culverted) at the lowest point of the valley be discovered

Consideration of the progressive development of an understanding of contours has been offered in chapter 4 It is relevant

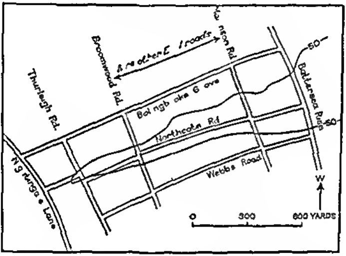


Fig 41 The Falconbrook valley Wandsworth

now to mention that such progressive development should also be arranged so that a repertoire of landforms, by means of contour examples, should be built up The hill and valley are first form examples In southern England scarp face and back slope force themselves upon the attention, elsewhere more elaborate valley forms may be the next step The contour map of a volcano, with or without dissection, is convenient second year revision, and the rift valley, which few studies of Africa omit, offers another obvious contour exercise This process can be continued during the third year, so that when more specific studies of particular landforms are made in fourths and fifths the pupils have a good background of patterns with which they are familiar Recognition rather than interpretation is a rough criterion of the difference between fifth and sixth form work Here above all map study

foundations usually reveals bedrock and a soil section, and almost any piece of open land can show erosion after a severe storm Normally the town school will need to make a short excursion to the nearest open space to study this material, and it can form excellent subject matter for a first organised half-day trip away from the school Page 156 gives an example on Hampstead Heath The pioneers of geography teaching saw the value of such excursions, and the early numbers of *The Geography Teacher* contain many reports of their work in physical geography (page 122)

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must be closely related to physical study. Thus at O level the question form 'Name three glacial features found on the map' could be expected The A level approach is 'Discuss the contribution of glaciation to the physical landscape shown'. Candidates whose work on glaciation had not been closely paralleled by map study would fare ill

The importance of close integration between study of the map and study of the landscape is so obvious that it hardly needs emphasis It has been implied, even repeated, throughout this book It is probably more important during physical studies than at any other time When the landscape itself is not available, pictures can be used to bring it into the classroom A great deal of indoor work on landforms should be by means of pictures, particularly as thinking in terms of three dimensions is necessary. This has long been recognised Some of the earliest classroom wall pictures were of landforms, this stemmed from the days when physical geography had developed as a recognisable science before geography as known today was acceptable At the risk of repetition we stress the importance of the use of pictures

Children can see and consider landforms from pictures before they have developed sufficient ability in contour reading to study them from maps Such picture study can also be made a basic training in field work (page 75) The development of an eye for country has been mentioned Recognition of landforms is an important and difficult component of this, and facility in this operation can be cultivated indoors We have maintained in principle that the progression should be from the field to the classroom, but in practice this is clearly only sometimes possible Picture training in such recognition is a very justifiable exception

The elementary stages are self evident When items such as those suggested on page 239 are studied, a picture of the feature should be available Ideally, the picture should be of the very example studied on the map In the early stages of landform recognition, of the two the picture is the more important Children can learn to see the form concerned without contour knowledge, and in any case the exercise of building up the appropriate contour map presents itself, but this, being difficult, is better left for older children The teacher will need to give considerable help on the blackboard

At fifth and sixth form level, a more sophisticated approach is possible, and the beginnings of the modern geomorphologist's attitude can be introduced We move beyond the simple factual

recognition of isolated features to the observation of repeated features, to the relationships of these repetitions, and to generalisations about the whole landscape Clearly at this point some consideration of explanations and theories of origins must arise, and this point is taken up later Older children, from pictures and from the actual landscape, should be trained to see the more subtle features, and their repetition An eye for *levels* or *flats* is one of the first conveniently developed, and in this connection it might be noted that the expression break of slope can be confusing, and needs careful definition A series of well marked river terraces are probably the easiest for beginners, under guidance, to observe This may lay the foundation for the later more difficult art of recognition of common summit levels, though this is probably better left until university studies The selection of other suitable elementary features will depend upon the material available and the skill and knowledge of the teacher A particular structural feature, be it scarp or volcanic extrusion, may be traced across a landscape The right skyline may show one or more silhouettes of the cross sections of river valleys Sometimes such a section appears in the middle distance, and means must be devised to direct the pupils' attention to this, the background being disregarded To continue this in detail would be to write a whole study of one aspect of the skill of the field geomorphologist

It will have become apparent that in this matter it is almost impossible to distinguish training from a picture and training from looking at the landscape The exercises shown on page 77 are very relevant here, and there are a number of excellent school texts which offer comparable material *The Land from the Air*[8] is a valuable collection of examples drawn from the British Isles Although much of its emphasis is upon the recognition of landforms, it frequently includes consideration of the human pattern of the landscape, and thus avoids the divorce of physical and human geography against which we have spoken

All the suggestions so far made ensure that the pupils study real examples The importance of this was stated forty years ago by Newbiggin 'It has always been an objection to the ordinary text book of physical geography that it treats the subject from too abstract a standpoint, giving for example generalised accounts of plains, plateaux, etc , without adequate discussion of particular examples, and thus producing an impression of unreality '[9] We maintain emphatically this principle, in the early years of

secondary school work To offer diagrams or sketches which are not of specific examples is to make an unnecessary abstraction, which increases the divorce between the classroom situation and the landscape Children readily acquire impressions of a stereotype If this is of a generalised, unspecified example, sometimes simplified to a point almost of falsehood, they will be forced into the position of having learnt a generalisation which they may later try to apply to particular landscapes They should instead be trained to observe a series of facts, and decide whether any generalisations are legitimate The stylised diagrams should thus be used only in more advanced studies, when possible generalisations are being considered

Another part of the factual basis needed for a later understanding of landforms leads us into the field of geology. The relationship between geography, geomorphology and geology is probably a closer and more subtle gradation than between geography and any other recognised subject These are but names for convenient subdivisions of knowledge, and as teachers of an integrating subject we must take full advantage of the opportunities presented The essential parts required are a knowledge of the nature of rocks and simple ideas on structure Suggestions have been made (page 238) about the gradual introduction of such knowledge Meanwhile we emphasise the importance of real examples Specimens of rock types should, of course, be available in the geography room Folds, faults, and intrusions are best first seen from exposures in the field

This leads us to consider field work We have so far stressed the importance of factual knowledge Field work is essentially an enquiry, so we can now begin to think of the problem of explanations We would still maintain the principle of observing facts first, but in the field particularly would begin to look for subject matter which can be readily explained, or which shows explanatory processes A guide to the enquiries children can make is 'What questions can we reasonably ask?' 'Where did it come from?' and 'How did it get here?' should put investigations and explanations upon the right lines

It has already been suggested that young children should observe simple processes, and that this will depend upon local opportunity Weathering, erosion, transport and deposition interest them when found as real, often moving, examples The study of a stream provides the best opportunity Cliffs, rock faces, and similar steep exposures also show simple erosion In

the absence of local examples, laboratory demonstrations can be given Indoor wave-tanks and stream models have been successfully built by technically-minded enthusiasts in more than one geography room Here, too, films may be useful There are many black and white films such as 'Water cycle' (11 minutes), 'Coast erosion' (6 minutes), 'This changing coast' (12½ minutes), and colour films such as 'Underground waters' (19 minutes), 'Rocks and minerals' (10 minutes), and the 'Birth and death of mountains' (12½ minutes) Care must be taken that the duration of these processes is fully appreciated and that the animated diagrams with which many of these films are illustrated do not stress another form of unreality Films may be most useful with older children

The sequence of field work studies on page 290 shows a planned progression of physical topics The elementary stream study could be in any of the first three years The fourth and fifth year excursions lead on to, among other things, a broader view of landforms It should be noted that they are still included as part of regional geography the observation of landforms suggested are items in a general field excursion Nevertheless at this stage the keen geomorphologist can legitimately make excursions which have a strong accent on physical features Fifth forms might make, if time permits, the semi specialised excursion to a particular area The area should show a clearly observable phenomenon for which elementary explanations can be discovered Orford Ness is a good example The elements of the situation are readily apparent, but there are ample indications that the whole story cannot be discovered from a cursory visit Although the emphasis is upon a physical feature, there are human phenomena to map and correlate The yachting on the river, and the isolation and land use of the spit itself are clear to see, while the visible decay of the village of Orford introduces historical geography

Sixth form work can rightly be more specialised, and the type of visit just described needs little adjustment to become a sixth form study Particularly useful techniques to be mastered by the sixth former are sketching of local features and annotating field sketches The beginnings of co-ordination can also be made The drainage pattern makes one kind of convenient base We do not suggest that sixth formers should become overnight research geomorphologists, but many research reports indicate activities which might profitably be included in sixth form field work

Peel and Palmer,[10] for example, in a physiographic survey of the Vale of York, suggest that plains tend to be neglected by physiographers, and add that there is no lack of intriguing problems within them Waters[11] states that if such a tract is studied, a tract being an environmental unit developed on one geological formation, there may be need for more detail of the shape of the ground than contour maps give He suggests the study of each facet of ground and its mapping, a morphological map being basically the 'cartographic expression of the distribution of such facets of the land surface' Whilst we do not advocate such detail for sixth forms, they could certainly 'by means of a few variously decorated solid and broken lines' map 'the nature of the junction between adjacent units' Macgregor[12] proposes that the student works out different degrees of slope, attempting a classification and discovering something of their influence on conditions such as drainage, soil, vegetation and the works of man Bridges and Doornkamp[13] cite work to discover the relationship between changes and breaks of slope and the soil Sixth formers might well follow their approach by simple investigations, these could lead to possible local generalisations such as that in many cases breaks of slope coincide with the boundary of a particular soil group

Indeed, soil can be studied in some detail, by means of a series of simple field and laboratory experiments Taylor[14] emphasises that teaching should be based not on the bare facts of standard global soils, but on explaining the stage of development reached by local soil profiles The best method of studying soil is *in situ*, in the field His suggestions reinforce our own experience, that sixth formers can extract soil samples with the aid of augers, and classify the textures by handling, squeezing, fingering and wetting not only surface but deeper samples They can estimate pH values by colour chart or by the application of dilute hydrochloric acid They can make use of colour photography to preserve records of soil profiles, the location of the samples can be mapped Since hill and valley soils receive different effective rainfalls, simple observations on how angle of slope, texture of soil and permeability of parent material cause variation in the levels of water tables can be made Finally, Miller[15] states that 'Nowadays the soil scientist, the botanist and even the zoologist study the effects of climates on the soils, the vegetation and the ecology so the geographer must be ready to listen to their findings and interpret them all together, and when considering

relief features to reconstruct the climate of the locality at the time of their formation' It is evident that sixth form study of geomorphology will include reading

Such essays into geomorphological activities may be considered too difficult for first year sixth or non examination pupils There are plenty of other studies possible It is a reasonable exercise to plot a collection of related features which have been discovered In this country glaciated highlands and limestone areas provide suitable material Corries, glacial lakes, arêtes, U shape and hanging valleys, sink holes, gorges, pavements, disappearing streams and dry valleys provide pupils with not only an opportunity to fit their discoveries together, but to exercise their ingenuity in devising suitable symbols to map them (Fig 42) Sparks[16] gives an example of unusual drainage diversions in the Portland ridge of the northern flank of the Weymouth anticline, and develops a report detailing study of dry valleys, springs, traces of an old highland valley floor and river capture which could all be seen and recorded, if not explained, by sixth formers The impact of great events like the Exmoor storm of 15th August 1952 cause major alterations in the landscape and are of lively interest to children The resultant hillside scars of Exmoor provide unusual opportunities for examining the processes involved in the development of these slopes, the Lynton area invites study of the West and East Lyn rivers with their propensity to flood There are other examples in other areas

Not all enquiry can be made in the field, and we now turn to the problem of the amount of explanation which can be attempted in the classroom As with other scientific matters, there is a gradation of validity Explanations vary from such visible fundamentals as the transport of sediment in a river and the descent of broken rocks by gravity to ideas about wave action or glacial erosion still under investigation The division as so often, can occur between fifth and sixth The majority of the explanations offered before this should be those which have the minimum of controversy and the maximum of acceptance Even earlier, care should be taken that fixed ideas are not firmly implanted in pupils' minds and even fourth formers should hear the expression 'This seems the likely explanation' on some occasions

This means that by the fifth form, children should have learnt something of the processes of weathering, erosion and deposition The work of water, wind and ice is another convenient grouping They will also have built up a knowledge of the major structural

forms needed to understand the landscape, and have a simple appreciation of earth movements There must be careful suggestions of the changing sea level, and of the slowness of this and other physical changes We have mentioned process and structure. As far as possible, we would make little mention of stage Youth, maturity and old age, even if correct or justifiable concepts, are

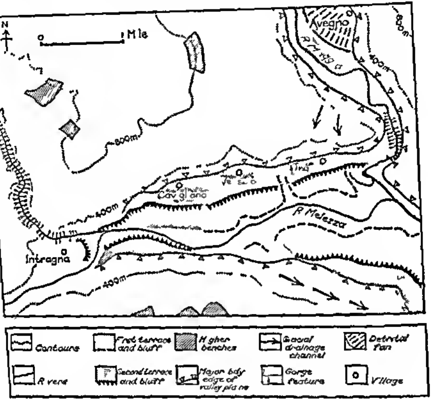

Fig 42 Val Maggia mapping of geomorphological features

the most mishandled by children The essential idea, which can be conveyed without necessarily using these terms, is of the steady *development or change in the landscape*

The knowledge which has been gradually acquired during four or five years must be revised and codified towards the end of the course This is traditionally done under such headings as the work of rivers, ice, wind and sea The surface features associated with rock types, particularly limestone, is another form of arrangement It will be seen that our approach has been largely in terms of *landscape*, and our generalisations under these headings

would be therefore on the common landforms found in each category Emphasis is also placed upon the subject matter exemplified in the homeland, and fortunately Britain is rich in examples The study of desert landforms is usually briefly considered when a particular desert such as the Sahara or the Colorado is studied Apart from this, landforms of arid and tropical climates are usually omitted, quite rightly, until the sixth form

Most of the topics mentioned can be adequately treated without reference to controversial or disputed explanations The work of rivers occupies such a substantial place in the average five year course that we feel bound to refer to certain mis conceptions 'The reasons why rivers possess certain characteristics are in many instances so obscure, that it might be thought that the geomorphologist should be content to note that certain tendencies occur without seeking to explain them in detail [17] Many school texts still present generalisations supported by selected examples, and in some cases are substantially incorrect No teacher can afford to neglect Dury s[18] iconoclastic remarks on this matter The concepts of greatest velocity on the steep gradients of headwaters and the formation of meanders on lessening downstream gradients will die but slowly In this as in other physical problems, one solution is for the teacher to keep as widely read as possible This is hard advice Another such injunction is for him to stay closely to observed or observable facts

We have insisted that a five year course in physical geography should be in the main a part of the general geography in the school Bottoms[19] suggests that children of all ages are interested in physical geography for its own sake, they particularly enjoy learning about great natural phenomena such as earthquakes volcanoes, geysers and underground rivers, and they want to know the effects of such phenomena on the lives of people Their attitude towards physical geography is sufficiently en couraging to merit its inclusion in the course because they want to learn about it, and he suggests the integration of the subject in regional studies according to the opportunities presented for examples which capture the imagination of the child

In the sixth form physical geography will be studied as a specialist branch and in much greater detail but the approach we have described still holds good This is borne out by an examination of A level question papers There is an insistence on

factual knowledge, and good description and recognition of landscape features When pictures are set, recognition at least as much as explanation of landforms is required The map questions almost invariably require some interpretation of physical phenomena, and candidates are constantly adjured to illustrate their answers by specific examples Apart from the greater depth of study, the main differences are the need for a modest awareness of differing theories, the ability to review knowledge by wide generalisation, and to remarshal facts not necessarily in the order learnt

Consideration of the question forms confirms this factual emphasis, and indicates the degree of theoretical knowledge required 'Give a concise description of the physical features shown', 'Give an account of the landforms resulting from', 'Compare the physical features of', are simple forms which require factual knowledge of the landscape 'Describe the main features of landscape produced by folding and faulting' is one form of straightforward question relating land surface to structure Explanations can also be straightforward in such forms as 'Give an explanatory description of' and 'Describe the effects of the following factors on' Where theories are involved, the question is more widely framed, in such terms as 'Discuss the nature and formation of' and 'Comment on the nature and origin of' Questions which may require a remarshalling of facts are, 'Suggest a classification of ' or 'Discuss the factors involved in'

The following reports from A level examiners[20] underline strongly much that we have said 'In physical geography we are dealing for the most part with observable facts the best way to become familiar with these facts is by direct observation in the field, failing that through map work and only lastly from a text book' 'The questions were designed primarily to find out what candidates knew of the *real* physical world A heavy premium was placed upon actual examples' 'The burden of this question was upon specific examples and the form of the ground, long descriptions of the nature of volcanic activity were not called for The best candidates gave well observed descriptions of glaciated scenery in Wales or the Lake District, and provided striking evidence of the value of field work The majority of the candidates were, however, penalised for giving purely theoretical answers' 'This question was designed to examine the candidates' ability to marshal facts'

These are generalised comments on approach Specific errors

commonly appearing in A level answers have been summarised by Pugh [21] Forewarning of likely physiographic errors may assist in their prevention Pugh lists as the most serious class of mistakes certain major misunderstandings Among these is confusion as to the meaning of longshore drift Spit formation, according to candidates, can be by currents, by tides, by waves thrown onshore by currents or by river alluvium deposited by chemical action In the evolution of stacks arch development is attributed only to the joining of two caves, seldom by a single cave working right through a promontory 'Questions on river profiles produce a number of fairly standard misconceptions The first is that the average river speed decreases from source to mouth Notwithstanding statements in older text books, it is difficult to permit candidates to state this today' The overdeepening of stream beds is attributed to water action, knick points disappear following the disappearance of the resistant bed, and the occurrence of knick points on the boundary between uplifted and unaffected zones is incorrectly exemplified The structural relationship of sills and dykes is often not known, tors and 'bosses' are commonly confused Glacial processes cause much misunderstanding Overdeepening is due simply to scooping, the development of a U shape in a valley lacks satisfactory explanation, corries are ascribed to the sagging of the surface under the weight of ice, and few candidates give clear accounts of retreating glaciers or ice sheets in relation to moraine deposits

It is clear that there are several basic principles applicable to the teaching of landforms in school There is an increasing insistence on the study of real landforms, primarily in the field Detailed suggestions for techniques on these lines are given by Johnson and Paynter [22] For geomorphologists at university level there is today enormous interest in slopes accurately measured and mapped, this is not basically school work Children may learn elementary measuring, but even the sixth form may lose the general picture in the detail of this survey It is more important that children learn to *observe* changes of slope Where field work is not possible the study of landforms is by means of map picture and description We have suggested a basic map collection elsewhere (page 59), there are many filmstrips from which the teacher can select relevant matching pictures Description comes largely from books the classic texts such as *The Principles of Physical Geology* by Holmes (Nelson, 1965), *The Principles of Physical Geography* by Monkhouse (University of London Press,

1958) and *Physical Geography* by Lake (Cambridge University Press, 1949) are illustrated with photographs and diagrams few of which are generalised The use made of these books, and others mainly produced for undergraduates, must be cautious in sixth form teaching. Sparks' *Geomorphology* and the various articles we have quoted are for the teacher, they will indicate the steady modification and decline of pure Davisian theory, and the geomorphological problems to which the answers are not yet known.

NOTES

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2 Scott Keltie, J Report of the proceedings of the Society in reference to the improvement of geographical education ' Royal Geographical Society Murray, 1886

3 Taylor, Professor Eva

4 Carter, C C *Land forms and Life* Christopher 1931

5 Sparks B W, *op cit*, p 20

6 Dury, G H 'Underfit streams in relation to capture, a reassessment of the ideas of W M Davis' *I B G Transactions*, No 32, June 1963 pp 83–94

7 Carter, C. C, *op cit*, preface p v

8 Dury, G and Morris, J A *The Land from the Air* Harrap, 1958

9 Newbiggin, M I *An Introduction to Physical Geography* Dent, 1925, p v

10 Peel, R. F and Palmer, J Physiography of the Vale of York' *Geography*, Vol XL, November 1955, pp 215–227

11 Waters, R. S 'Morphological mapping' *Geography*, Vol XLIII, January 1958, pp 10–17

12 Macgregor, D R. Some observations on the geographical significance of slopes' *Geography*, Vol XLII, July 1957, pp 167–173

13 Bridges, E M and Doornkamp, J C. 'Morphological mapping and the study of soil patterns' *Geography*, Vol XLVIII, April 1963, pp 175–181

14 Taylor, J A. 'Methods of soil study' *Geography*, Vol XLV, January 1960, pp 52–67

15 Miller, A Austin Climate and the geomorphic cycle' *Geography*, Vol XLVI, July 1961, pp 185–199

16 Sparks, W 'Drainage diversions in Dorset' *Geography*, Vol XXXVI, July 1951, pp 186–193

17 Sparks, W *Geomorphology*, p 98

18 Dury, G H Rivers in geographical teaching ' *Geography*, Vol XLVIII, January 1963, pp 18–29

19 Bottoms, S 'An investigation into the attitude of Grammar School children towards the study of physical geography' M.A., Leeds, 1958

20 University of London School Examinations Council Subject Reports, 1961–1964

21 Pugh, J C. Some avoidable errors in physiographic studies ' *Geography*, Vol XLIX, January 1964, pp 44–49

22 Johnson, R. H and Paynter, J 'Landforms and field studies' in *The Purpose and Organisation of Field Studies* (ed Dilke, M) Rivingtons, 1965, pp 89–123

YEAR TWO · AFRICA

AIM: To find out the main characteristics of deltas.

MATERIALS REQUIRED:

(i) Atlases.
(ii) Sheet of maps (Fig. 13) for each child (or on board).
(iii) B.B.C. Travel Talks pamphlet Spring Term, 1956, page 19 (Nile delta), or any similar picture of Nile delta.

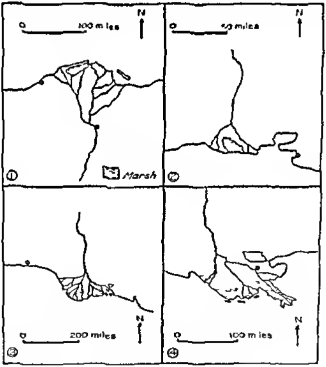

Fig. 43. Map sheet for lesson on deltas.

METHOD

1. Look at the map sheet There are four little maps, each showing a river running into the sea. What does the line |⁰‾‾‾‾‾‾‾‾‾¹⁰⁰| show? [Indicate linear scale.] (*Scale.*) And the arrow? (*To show N.–S.*) In

map one in which direction is the river flowing? (*North*) So you will find it on the north coast of a country Look at your atlas, page *xx*, and find it Find also the name of the country and the sea Map one shows? (*River Nile in Egypt, flowing into the Mediterranean Sea*) Write these names correctly on map one The river in map two is flowing? (*South*) Find it on atlas page *xx* Name the river, country and sea on the map You will find the river of map three on page *xx* and of map four on page *xx* Complete these maps

2 These maps show a certain shape [Draw appropriate triangles on board] It is? (*Triangular shape*) The Greeks noticed this shape, and since it was like one of their capital letters, they called it similarly? (*Delta*) Now by the figure 1 on the first map write Nile delta, and do the same for the Rhone, Niger and Mississippi maps

3 Look at the maps What happens to each river as it approaches the delta? (*It splits up*) Splits up into a number of streams or rivers What is the name given to a stream which joins a larger one? (*A tributary*) These rivers are the opposite—they flow from a river They are called distributaries Each distributary carries material—what is the name for material carried along by a river? (*Silt, alluvium*) Let us see what happens [Build up diagram on board] On reaching the sea, does the river current increase or slow down? (*Slows down*) What happens to the silt in calmer water? (*It settles*) This process is repeated The land gradually grows As soon as it appears at the level of the water, what will happen? (*Weeds grow*) Vegetation appears What does this help to do? (*Make land more solid*) What will the coastline be in the future? [Add line to board map]

Now draw your own diagram and give it a title

4 Let us see what we have found out about deltas What happens to the river? (*At the delta it splits up*), into channels called? (*Distributaries*) Look at the maps What do they tell you about the land of the deltas? (*It is marshy*) If it is marshy, we know it is also? (*Flat*) We know what the land is made of? (*Silt*) And we know what all deltas are doing all the time? (*Growing out to sea*) [Add board summary (i) At delta the river splits up into many channels called distributaries (ii) The land is marshy and made of silt. (iii) Deltas are growing out to sea]

5 Am now going to read out a short description of a delta Listen for confirmation of any ideas you have heard, and for information about the people.

In the delta south of New Orleans there are few farms or villages, a pilot station, and quite a number of fishermen Most of the dwellers in the swamps could not be reached either by rail or road because

there was no railway, and beyond a certain distance, no road There is but one main channel I found one small boat which journeyed through it twice a week The banks were very low and trees came down to the water s edge, the water itself looked muddier than ever There were no more hills, but many sandbanks There was nothing to break the level skyline except an occasional clump of trees The land was a wilderness of marsh and swamp Patches of tall reeds were the home of thousands of birds, and I wondered if there were any alligators in these murky waters' (Freely adapted from Young, E *North American Excursion* Arnold, 1947)

What town is mentioned? (*New Orleans*) What river is New Orleans on? (*The Mississippi*) So which river delta is referred to? (*Mississippi*) Yes, is part of Mississippi delta south of New Orleans What does description emphasise? (*Marshy, muddy, no hills, vegetation*) About people? (*Very few*) partly because communications? (*Poor*)

6 This is not all the story Here is a picture of the Nile delta We are on hills looking over the delta What is the far skyline? (*Hills*) In between? (*Flat land*) Look at the skyline—in which direction is it sloping down? (*To left*) Then where is the sea? (*To the left*) Are we looking at the widest part of the delta? (*No*) [Locate picture on atlas map] The foreground of the picture is desert Tell me what you can see on the delta which is not in desert (*Trees, houses, fields, villages*) So we can add another note to our board summary [(iv) Where the land is not marshy, it is good for crops]

7 Conclusion We have found out what are the main characteristics of deltas Now make your own summary of these in your exercise books Next lesson we shall learn more of the Nile delta and the Nile valley

LESSON 18

YEAR FOUR EUROPE OR YEAR FIVE BRITISH ISLES*

An introductory lesson on glaciation (double period)

AIM To discover the effect of ice on a mountain landscape

MATERIALS REQUIRED

(1) Filmstrip Glaciation in Highland Britain (C 6287) Educational Productions Limited Frames 2, 3 18, 20, 21, 22

* This lesson was kindly contributed by Miss M Goss M A of the Inspectorate of the Inner London Education Authority

(ii) O S. map 1 inch to 1 mile. Sheet 107. Snowdon.
(iii) Individual base maps of the Snowdon area for testing and recording (Fig 44)
(iv) The blackboard will be used to list the terms underlined below.

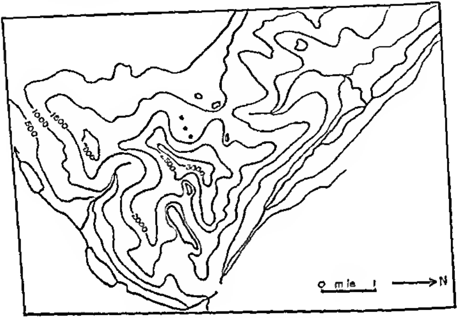

Fig 44 Base map of the Snowdon area

METHOD

1 Frame 2 An alpine snowfield The Alps are the highest mountains in Europe and have permanent snowfields such as this Why is the snow cover not continuous? (*It collects in hollows and on gentler slopes but cannot rest on the steep rocky slopes which rise above the snowfields*) What effect does constant freezing and thawing have on the peaks? (*It widens cracks and causes the rock to break up*) This is called frost shattering

2 Frame 3 An alpine glacier. The snow becomes hardened to form? (*Ice*) The ice flows gradually downwards taking the easiest route which is? (*Down the valleys*) Ice which flows down a valley is called? (A glacier) Describe the surface of the glacier (*Rough, irregular, cracked*) How could the cracks have been caused? (*By movement*) Such cracks are known as crevasses What do you notice along the sides of the glacier? (*Rock fragments of varying size*) These rocks are called moraine, and those which lie along the sides of the glacier are lateral

moraine Where does moraine come from? (*The peaks above*) and? (*It is torn from the valley side by the passage of the ice*) Some moraine is called terminal moraine. Suggest a reason (*It is moraine which is deposited at the end of the glacier where the ice melts*) The end of the glacier is called the snout

3 In the Great Ice Age, 25,000 years ago, snowfields and glaciers such as these existed in the mountain areas of Britain, e g Snowdonia

Frame 18 Snowdon from Glaslyn Describe the shape of the peak (*Conical*) Describe the ridges leading to the peak (*Sharp edged*) Such ridges are known as aretes Describe the hollow in the foreground (*It contains a round lake on its level, moraine strewn floor, and steep slopes rise to the peak behind*) Such hollows which surround Snowdon are called cirques but the local Welsh name is cwms Suggest how they were formed? (*By small glaciers which enlarged existing hollows*) They are separated from each other by? (*Aretes*)

4 Frame 20 Snowdon and the lip of Cwmglas seen from the Pass of Llanberis below Notice the shape of the cwm It appears as a valley high above the main valley Such valleys are called hanging valleys A swift stream descends from the hanging valley to the main valley

5 Frame 21 The Pass of Llanberis Describe the scene? (*Very wild and desolate*) What does it show? (*A deep valley with steep sides strewn with moraine*) How was it formed? (*By the passage of a glacier which widened and deepened it*)

6 Frame 22 Nant Ffrancon valley This is a more typical glaciated valley How does it differ from the pass of Llanberis? (*It is broader and straighter*) Suggest a reason for the difference? (*The rock is softer and the glacier was able to widen and deepen the valley more easily*) We call such a valley U shaped The spurs have been worn away or truncated

7 Study of sheet 107 Snowdon, to identify the places seen in the pictures Where are the larger lakes situated? (*In the valley floors*) Suggest a cause? (*They are moraine damned lakes*)

8 On the base map of Snowdonia
(a) Name the Peak (Y Wyddfa) and give its height
(b) Indicate the aretes with a thick line
(c) Shade in dark blue the lakes situated in cwms Name the larger ones

(d) Mark with a c the cwms which do not contain lakes
(e) Shade in light blue and name the moraine damned lakes in the valleys
(f) Mark the position of two waterfalls which indicate the steepening of the slope between the hanging valley and the main valley
(g) Make a key for the map

9 Conclusion The map you have drawn summarises much of the effect of ice on a mountain landscape Write a short paragraph to describe these effects [Check these with class]

CHAPTER 13

THE FIRST YEAR'S WORK

We have completed a review of essential methods and particular aspects of geography teaching It is now necessary to implement these ideas in terms of content We first consider the introductory year's work, including some background of primary school teaching This is followed by a consideration first of the main layout of the five year course, and then by more detailed discussion of sixth form work

Their first days in a secondary school are thrilling days for many children, such children form some of the most receptive material we teach There are allegations of dejection and sense of failure for those who do not enter selective schools—though this sense of failure may bear more heavily upon the parents than upon the children themselves For nearly all children there is the excitement of entering a new world, for many certainly the attractions of an elaborate new building, and for many also the unexpected confrontation with subject specialisation Although there is usually detailed co operation between the primary and secondary school so far as the promise, personality, behaviour and general character of the children are concerned, there is singularly little liaison at subject level The former type of co operation is very right and proper, but the secondary school teacher should, all the more, make some attempt to find out the previous geographical knowledge of his classes Indeed there is scope here for teachers to organise small local conferences to this end

In view of the fact that the children will come from several different primary schools, and in some cases from a very large number, there is little likelihood of their having followed any common course, again, there is no suggestion that they should There have been many statements about the general type of work which should be followed in primary schools, this seems an appropriate place to review them Knowledge of them is essential for the secondary school specialist The words of the Hadow Report[1] are still a valuable guide 'The curriculum is to be

thought of in terms of activity and experience, rather than of knowledge to be acquired and facts to be stored'

There are two books which give an excellent picture of what both teachers and geographers would like to see happening in the primary schools, these are the Ministry of Education's *Primary Education*[2] and the Geographical Association's *Teaching Geography in Junior Schools*[3] These works are complementary, in that the former publication indicates broad principles, and the latter offers specific advice which is very much the implementation of them Perhaps the chief fact for geography teachers is that the Ministry in 1959 in its section on geography is not basically different from Hadow in 1931, nor was the Board of Education in 1937[4] Work in the primary school 'must be thought of in terms of activity and experience though due regard should be paid to the stimulation of the imagination by vivid description'[5]

Primary Education[6] suggests that the study of the locality has two main merits the facts that children are intensely aware of the district in which they are brought up and that its study can be based very largely on their first hand experience This experience is often sufficiently stimulating to provoke further investigations The teacher's object in study of other parts of the world is to build up in the children's minds as true a picture as possible of what other lands are like To this end he should make use of traveller's accounts, pictures, films, broadcasts and other material which should be implemented by discussion and reading Maps are to be regarded as an indispensable source of information and should become a source of increasing interest and delight There is stress, too, on books as sources of accurate information in both text and picture, and of the importance of the children's records of their work

Teaching Geography in Junior Schools first sets out some of the principles which should guide the teacher in syllabus planning It then lays stress on the need for geographical work to be based on observation and experience, and thus on the study of local geography It includes a syllabus and local work It suggests that since only a small, though very important part of geography, can be learned at first hand, much of teaching aims at giving the children vivid second hand experiences of other parts of Britain and the world, so that a section is devoted to the ways in which such experiences can be given There is emphasis on the need to collect study material such as pictures, specimens, diagrams, models and descriptions, with examples of their use.

Finally, five ways in which junior school children can record are suggested—by illustration, models, maps, diagrams and by writing.

This is rightly an idealist picture, and it is difficult to assess to what extent children will arrive in the secondary schools with this training It is easier to explain why they may not The geography advocated in these two books is geographer's geography It is correctly adapted to the needs and abilities of young children, but considerable training and insight on the part of the teacher is needed to see the relevance of it to later studies The primary school teacher is not a specialist in subjects, he is rightly a specialist in young children, and it is asking much of him to have a deep knowledge of geography and geographical ideas We make no suggestion that junior school teachers should attempt to train little geographers Their function is to help young children grow up, and good primary school geography is to a considerable extent a matter of activity of various kinds, directed towards the child acquiring a sense of space, of exploration and of the world, not a study to be entirely separated out from the other activities of the curriculum When the teacher feels unable to direct such activities, he tends to fall back on the text book, and this kind of geography is in very few books The *Discovery Books* by Olive Garnett (published Basil Blackwell) are splendid examples of the few There are many texts which give well illustrated material of a story book type, on the general theme of 'Children in other lands', but save in moderation, it is doubtful whether they are more real to children of primary school age than any other story which captures their imagination

The suggestions of the Ministry of Education and the Geographical Association offer wide scope to the junior school teacher in the selection of material Basic skills of measuring and mapping should certainly be expected, but other material studied will depend on the choice of the teacher, the opportunities of the locality, and the interests of the children Those from one school may have done an excellent study on, say, tea production in Ceylon with all its concomitant detail, others, equally well taught, could quite conceivably not have heard of Ceylon

In view of this, the teacher planning the first year's secondary work can count on very little specific common knowledge, and not always on certain basic skills He must, therefore, plan the work so that, as necessary, these skills are revised or taught His aim should be that at the end of the first year children should

have, first, ability in the basic skills of geography, largely in map work, secondly, an understanding of the elements of geography (which we will elaborate later), and thirdly, some knowledge of the British Isles and perhaps of the rest of the world

There is one further point to be remembered This is the first year These children are only eleven years old They do not change in the summer holiday from busy, active ten year-olds to quiet academic children willing to sit for five hours a day to be instructed It is a most painful situation to see children accustomed to the wide activity of a well run primary school trying to confine themselves to the more formal atmosphere of secondary schools Surely this should be regarded as a transition year The first form teacher must try to give the children plenty to do, though much of this is often sitting at a desk with pencil and paper activities

Against this background we can consider in more detail what is to be done by the end of the first year We are fundamentally concerned with laying foundations in as interesting a form as possible As children of this age are most concerned with concrete things, these foundations should be laid by means of specific examples Nothing is more remote from the understanding of children of this age than broad generalisations These examples should be as real as possible, and thus material from the British Isles is probably the best vehicle There is more agreement on the content of the first year's course in our secondary schools, than on any other aspect of the syllabus This is indicated by the similarity in layout of the great majority of books on the market aimed at the first form

In drawing up a list of the basic ideas we wish children to know fairly early, we shall probably be tempted to include too much Let us rather consider what can be left out, i e what can be saved until the second or third year A useful criterion here is whether the particular subject matter is well exemplified in the British Isles Other phenomena, which are better illustrated in other lands, can be left till these are studied One of the most difficult aspects of the art of syllabus construction is the correct sequential arrangement of material Thus a child cannot properly study the valley pattern of chalk downland until he can read contour lines, nor appreciate the agricultural advantages of the Prairie Provinces until he knows how wheat is grown With a syllabus well arranged on this principle the teacher should never be faced with the situation wherein he is trying to proceed from the unknown instead of the known

We offer therefore the following topics They cover matter and skills which are necessary bases for all further studies, they include the first elements of physical and human geography, of map techniques and the beginnings of a geographical vocabulary, they are not necessarily in order of precedence First there is map work, the detail of which is considered on pages 50 to 57 Second is weather study, as suggested in the climate chapter, pages 213 to 216 Third is the study of simple rock types, such as sand, clay, limestone, slate and granite Fourth comes the building of the beginnings of a vocabulary of physical terms such as watershed, river basin, plateau, plain Fifth is consideration of the elements of agricultural processes, the recognition of crops like wheat, oats and barley, and terms such as the rotation of crops, mixed farming, market gardening, arable land Sixth, equally necessary, the elements of industrial processes, smelting, coal mining, spinning, weaving, fishing and port activities Seventh is the elements of mathematical geography, the first year details of which are given on pages 188 to 190 Finally comes some realisation that there are very different places and ways of life in the earth The following statement,[2] although written about the end of the primary school years, could well be accepted as guidance about this work at age eleven 'At the same time, they should have been given pictures of other parts of the world which, by discussion, careful choice of reading matter, and illustration, have been made alive by vivid detail This can be done if regions or topics have been kept sufficiently small There is thus spot lighting of particular places and less likelihood of over generalisation in the interests of simplification'

Much of what has been listed above consists of factual data, without which later geographical work is meaningless Clearly if the children do not know what the crops or the rocks they are considering are actually like, their work is on a basis of unreality On this principle, there is often considerable time given in the first year to descriptive work on various economic activities of the homeland, in our case of coal mining fishing textile manufacture and smelting There is a good case for this, but the teacher should be aware of why it is being studied If purely descriptive matter is being offered, it could well be justified as essential general knowledge of how people earn their living in this country This is not geography, though if it is omitted from the syllabus of every other subject, the geography teacher can well remedy the deficiency It might be advisable for the teacher to ensure,

however, that the relevance to later geographical studies becomes apparent. The lesson on how the blast furnace works should be given in a way that brings out the fact that the works must have access to certain raw materials. The lesson on fishing should not be merely a description of the difference between trawling and drifting, but related to the natural conditions of the seas concerned. A description of a coal-mine is excellent material to widen the knowledge of children in this country of how people live; more specifically geographical work is the resulting landscape features of the surface apparatus, or the relationship of the layout of the mine to the underlying strata. A major criterion of this type of material is, therefore, is it relevant to later work of explanation of a location or a landscape? If so, its treatment should be one that interests the children and encourages them to learn facts which will be necessary in their later work.

How are we to implement these ideas in terms of a specific layout of syllabus for the first year? A widely used pattern is that which was originally elaborated by Fairgrieve in his chapter *The First Year's Course.*[8] In summary, this was the school and the school locality, a series of studies on the homeland, and some studies of places in the rest of the world. This scheme, too, implements the suggestions put forward in the Ministry of Education's pamphlet 'Geography and Education',[9] where the emphasis is on the study of the locality for training in observation and laying foundations of reality, for satisfying the child's sense of wonder and his growing need to know the reason why.

Most teachers would open their work in secondary school geography by lessons on the locality; many are prepared to elaborate this for up to half a term's work. The traditional sequence of lessons is a map to show where I sit, where the school is in relation to the playground, and where the school is in relation to the neighbouring streets (pages 51–52). As has been shown in chapter 4, it provides the foundation of all later map reading and conception of scale. If it is omitted, some exercise using large-scale maps of the locality must be devised.

At an early stage should come at least one lesson which is a walk round the streets or area near the school (lesson 11, page 154). This can be placed in its setting by study of a very large-scale map. A street map drawn for this purpose is often more suitable than published maps. These lessons can be expanded in classroom studies by some lessons on the local borough, and its position in the county. The pattern of lessons will vary

according to the location of the school, it will reflect the emphasis necessary to establish the essential features of the locality, be it urban or rural The work of a school in a port will differ in application but not in essence from that of one in a market town, a rural school may concentrate here on agriculture, whereas the context of an urban school may be industrial—the idea and aim of all is similar

In general, this local work should be expanded according to the opportunities presented There may be elementary landforms The local river and river basin will permit the introduction of terms in connection with it Urban areas offer a more restricted field for local examples of soils, vegetation and agriculture, and thus these must wait until it is possible to visit an open space Every opportunity should be taken to introduce published maps, and except in very level areas the local work should include the simplest study of contours

It is idle to pretend that, having placed themselves in a locality as large as the borough or county, children of eleven have developed a sufficient sense of scale and location to understand precisely their relationship to the rest of the homeland Their experience is limited, and in many cases, other parts of the British Isles seem simply a long way off Their conception of space and distance will build up slowly, and this will be developed by the series of studies in the British Isles which follow

We emphasise at this point that these are not regional studies in any formal sense of the word They should be a series of studies of specific places or topics, chosen as convenient to give some acquaintance with different parts of Britain Each study will examplify the topics suggested on page 261, and will start to build up a minimum knowledge of the homeland This is easy planning for the teacher, there is a wide choice of examples of any given matter, and he can choose those he knows, those of which he has good material, or those which have some particular connection with the school s locality

There will be agricultural studies It is still possible for some urban children to visit a local farm on the outskirts of town, if not, this must be done vicariously by means of a sample A source of material of particular importance because it not only gives detail but keeps pace with change is the Farm Study Scheme[10] of the Association of Agriculture In England the obvious selections are of arable farming in the east or south and pastoral farming in the west Some study of agricultural life in the wetter

highlands should also be made A study of highlands is useful, less able children will appreciate a descriptive view, more able children can begin to understand why they are regions of decreasing population Consideration of elementary facts about rainfall fit in here All this work can be made the vehicle for the elements of geography already mentioned The country child will know the appearance of wheat or oats, the town child will need to examine and draw them A school in a fruit or market-gardening area may already have studied such activities, others may need to introduce the terms at this stage Although regional studies are not being made, appreciation of place and some realisation of regional difference are being absorbed

England offers a wide choice of industrial material, and of course industries with a simple structure should be chosen The steel or textile industry consists of particular works or factories which are explicable and comprehensible The ramifications of the chemical industry or the varied forms of the engineering industry are better left until later A study of a coal mine affords opportunity to study one of the bases of English industrial development, and many elementary geological terms can be introduced To consider why there is a steel industry near Tees side gives the chance to see how a blast furnace works, as well as introducing explanations If the textile development of the West Riding is considered, the neighbouring millstone grit and limestone of the Pennines can be mentioned

Britain is a maritime country, and a series of studies related to the coast are justified Work on fishing can lead to a knowledge of the continental shelf, and some study of tides when harbours are dealt with A port study will interest children, and give them a chance to draw different types of maps and perhaps simple graphs to show imports and exports Such terms as estuaries, and others of a similar degree of simplicity will also be mentioned

The work outlined offers ample material for the first two terms, and it could easily be extended into a third The studies are in the main specific—a factory, a farm, a port, a coal mine, though for variety some more general topics should be interspersed Some form of co-ordination should be made Each place could be plotted on an outline map of the British Isles, and one or two studies which involve the British Isles as a whole, such as a consideration of a motorway or a main railway line could well round off this part of the work.

Some suggestion of studying larger units is now entering the

scheme, and the third term could well be given to studying other ways of life, not exemplified in the homeland They will be selected to cover, in a very simple form, the major natural regions In this way such new material as tropical crops, desert features and forms of vegetation can be introduced Not all need be by sample A journey to the Congo or across the Sahara requires new raw material and style of mapping The study of a crowded monsoon area brings a first consideration of population density or perhaps of irrigation Complete cover of the world will not be contemplated, but constant reference to the globe will build up the beginnings of an appreciation of the world as a whole, and of the idea of latitude and longitude Again the places studied can be plotted on a world map

We have made clear our belief that the first year's work should consist of the introduction of basic ideas by means of the most convenient specific material, mainly from the homeland The teacher will select according to his taste There is another principle to be remembered This is the year in which children, one hopes, will learn to like geography, and the matter should be made as attractive as possible This does not mean it need not involve work The main attraction for young children will be the opportunity to do things by making a variety of records and working on a variety of exercises Relevant parallel informal out-of-school activities should be encouraged Collections of material interest the young at this age These can be gathered on the walls as display of a particular topic, or in a scrap book as an individual activity Particular events may well introduce a particular lesson A disaster at sea is a very real statement of the need for a form of location, and an eruption or earthquake will justify a temporary abandonment of the set plan Some allowance in planning should therefore be made for such alterations

Finally, if first year geography is to fill children with a desire to continue its study, it must be shaped to stimulate their curiosity It must amplify their knowledge of words and appreciation of their meaning It must be a study of places made real by the use of all the resources at the teacher's disposal—photographs stories, films, descriptions, maps, models among them Direct observation where possible, and accurate, vivid description where it is not, are as vital to the first year secondary school child as to his junior school counterpart, from which he differs by very little Indeed we suggest that these principles hold good for the whole of school geography, and the construction of the syllabus,

with which our next chapter is concerned, should provide every opportunity for their implementation

NOTES

1 *Report of the Consultative Committee on the Primary School* (*The Hadow Report*) H M S O, 1931, p 93

2 Ministry of Education. *Primary Education* H M S O, 1959

3 *Teaching Geography in Junior Schools* Geographical Association, 1959

4 Board of Education *Handbook of Suggestions for Teachers* H M S O, 1937, p 441

5 *The Hadow Report*, p 171

6 Ministry of Education. *Primary Education* pp 295–304

7 *ibid*, p 303

8 *Geography in School*, Chapter XI, pp 121 142

9 Ministry of Education Pamphlet No 39 *Geography and Education*. H M S O, 1960

10 Association of Agriculture, 53 Victoria Street, S W 1

CHAPTER 14

THE CONSTRUCTION OF THE SYLLABUS

A SYLLABUS is an abstract giving the headings or main subjects of a course of teaching, a conspectus or programme of hours of work. Insufficient emphasis is placed on the fortunate position of teachers in this country, completely free from the imposition of any syllabus dictated by the Department of Education and Science or Local Education Authority. This freedom entrusts the teacher with what should be regarded as one of his greatest privileges, the planning of his own course This planning is one of the most important parts of a teacher's work, for it epitomises his whole approach to the teaching of his subject The formal summary of content given in published examination syllabuses does not inhibit his freedom to plan the detailed steps of his course, and upon the quality of this much of his success depends

Despite the implication of complete freedom, the construction of a sound geography syllabus involves the application of certain basic principles First, it is important to bear in mind why geography is being taught in school The reasons have been discussed in chapter 1. Individual teachers may wish to stress particular reasons Some will accent geography for citizenship, some for leisure All, one hopes, will see its cultural value Whatever other reasons may be favoured, the modern teacher will surely assume some prospect of the child's becoming a world citizen in the social sense, so that the syllabus will need to cover the whole world The very name of the subject implies that such an aim is essential

It is necessary to stress this The non specialist may well feel inadequately prepared for world study, and deserves sympathetic consideration for his diffidence It would appear that nowadays the specialist is in a like quandary The range of geographic studies at university level is encyclopaedic The undergraduate is faced by an enormous range of specialist options, from biogeography and oceanography to pedology and photogrammetry There may be, however, substantial gaps in his regional cover

It seems right and proper that the teacher's own special interests should receive some emphasis—not over emphasis—in his syllabus, for these he knows well and is likely to put over with enthusiasm and inspiration Lack of detailed knowledge or lack of interest on the part of the young teacher is no justification for omitting major areas in the school syllabus It is not inappropriate here to suggest that the relatively limited areas included in public examination syllabuses for detailed regional treatment are not intended as indications that these are the only areas to be studied in a five year course Many children will have no guided geography courses beyond the fourth or fifth year, if they are to have geographical insight into world problems, or any approach to world citizenship in the broad meaning of the term, study at some level of all the continents is essential

A second principle to be borne in mind is that the syllabus should be based on the psychological development of the child Growth is a continuous process, therefore the syllabus should be organised to provide continuity There are difficulties in organising continuity between primary school geography and that of secondary schools (page 257), but within the secondary school course the syllabus should be planned as a four or five year unit The syllabus should not only be graded according to the difficulty of the area or region—for example, it is easier to teach about the equatorial forest than to explain changes of vegetation with altitude, and the life of a Bushman shows a more direct relationship to environment than the complications of life in the Ruhr industrial area—it should be graded to include skills appropriate to the age group using them These skills should be those necessary to the geographer and in continuous and continual use Furthermore, there should be constant cross reference from a subject in one continent to a similar subject in the next continent Thus if, for example, the features of the coast of Scotland are studied in year one, those of Chile or New Zealand in year two, that of British Columbia in year three and so on, their treatment should be not as of completely new matter, but as connected topics of similar genesis This assists the establishment of generalisations, a building up in the child s mind of an appreciation of certain fundamental patterns such as those of major regions, or the features associated with coastlines These patterns, whether of physical or human distributions, are one of the geographer s main findings

Basing the syllabus on the psychological growth of children

implies that it should be geared to their intellectual and emotional needs This aim is difficult to achieve, for even among the selected entrants of grammar schools there is wide range of development, and the range is very great indeed in non selective schools Little generalisation is possible, except that in most cases between the ages of twelve and fourteen years children are mainly attracted by descriptive geography, whilst their need for explanations is generally satisfied by relatively simple statements [1] Their powers of and interest in abstract reasoning broadly develop later, and attempts to force this development prematurely may engender distaste for what may appear to them to be arid learning Between the ages of fifteen and eighteen years the intellectual ising process begins in earnest, and it is unlikely that before this stage adolescents appreciate that it is possible to compare explanations and assess their relative merits Emotional development has been found to be discontinuous and not all adolescents have emotional problems The less able are more likely to react unfavourably to failure and against difficult tasks For them there is the specific need to be given work which is within their powers, able children may well find more difficult work a challenge and stimulant Thus in syllabus construction it is necessary to be aware of the dangers of trying to cover too much ground in a given time, or of forcing the pace of growth

A third *principle of construction is that the syllabus should* include all aspects of geography If we are to present a balanced picture, the work must contain some reference to the main branches of the subject We need therefore to include substantial areal cover of the world, with some reference to such systematic topics as physical geography, economic geography, bio geography and cartography The interest of children in other peoples suggests that much of this work should be approached through human geography If the teacher has made a study of some other aspect without which he considers geography to be incom plete, perhaps historical or political geography, such aspects should be included, their inclusion being guided by the age and ability of the children for whom their study is intended

Some consideration of the teaching time available must also be borne in mind This is a fourth vital principle In many schools geography is allocated two forty minute or forty five minute periods a week, with one homework, for the first four years with three periods a week and two homeworks for the fifth year Thus in a fifteen week term for the first four years there are thirty

geography lessons, but in general, as any teacher is aware, a considerable proportion of teaching time is lost in other educational pursuits It is wiser to plan for about twenty six lessons a term The need for detailed planning to ensure sound use of all time available cannot be over emphasised For less able children this planning is even more vital, since they learn more slowly and cover less ground in any given amount of time

Work should be planned, therefore, bearing in mind the reasons for geography teaching, a balanced view of the subject, the limited amount of time available, and the mental age and ability of the children concerned Since most geographical thinking is inductive, that is explaining observed facts, teaching will need to start with factual observation in a real context—from the particular to the general, from the known to the unknown, from concrete to abstract The order in which the content of the syllabus is to be arranged is thus affected Each year's work should be devised to build on the foundations of previous work in order to maintain a steady growth of the subject according to the development of the child s mind The syllabus must match the quality and interests of the children who are to use it, it is the instrument of the teacher who created it

It will be clear to readers of this book that we believe regional geography to be the core of the subject The syllabus in which we have the greatest faith will be that based on regional geo graphy Before dealing with such a syllabus, let us briefly consider the alternatives Some schools plan their geography courses through topics, such as food, raw materials or power These topics are presented by means of examples which serve in some measure to illuminate various regions of the world Thus the study of cocoa emphasises the features of the equatorial region, that of rice those of monsoon climates, whilst the study of wheat offers detail of the cool temperate lands These topics may be grouped together to form a theme of study for each year Year one presents food, clothing and shelter in selected parts of the world, year two deals with transport and trading, year three with power and manufactures and year four with world problems

Some teachers prefer an approach based on different aspects of geography In this case year one stresses human geography by a series of sample environments, some from the home country, some from overseas Here the repetitive pattern is that of the sample study—an East Anglian farm, a Mediterranean farm, a desert settlement Year two is sometimes devoted to physical

geography, beginning with some study of rocks, then proceeding to consider various landforms This attempts another world view, the physical one, and the reality of the geography depends upon the teacher's use of real examples Year three focuses attention on climate, again on a world pattern This may include the effect of climate on vegetation, and can be expanded to include some reference to the effect of climate and vegetation on man, with an introduction to the natural regions of the world Year four is devoted to economic geography, sometimes based on the needs of man It inevitably entails the study of many raw materials, products and industries To complete the course this syllabus involves a fifth year, which will be, as is normal, a revision year For this year is left the whole of the regional geography of the world Revision in this case entails the summing up of the fundamental facts of physical, climatic and economic geography, and adopts the regional method in examining the continents, treating the more highly developed parts in some detail In our view, this sum of the parts of geography does not equal the whole, a study of all aspects has not given the core of the subject Putting it at its best, after four years of preparation the regional synthesis has yet to be made, at its worst, four years of generalised study have preceded the particular study of regions

A third type of syllabus which has developed is the concentric syllabus, a plan fully discussed in *Geography in Secondary Schools*[3] The concentric layout deals with the subject matter exemplified in the locality, the British Isles and the rest of the world, in that order Each year's work consists of a number of themes perhaps two per term Year one's themes may deal with food, those of year two with raw materials, year three selects the chief manufacturing industries and year four deals with what may be summarised as ancillaries—holiday areas, air routes, population in areas of thin or great density This scheme links the theme with the region by tracing it through the locality, the British Isles and the rest of the world Thus if the theme is wheat, the selection of work would be the mapping of local shops or factories concerned with wheat or wheat products, study of a wheat farm in East Anglia, the distribution of British wheat lands, ports of the British Isles handling wheat, the Canadian prairies, wheat farming in Australia or the Pampas or both, and world trade in wheat Many themes lead to the final study of a major region This syllabus is regarded as flexible because it is possible to substitute study of a current event of geographical importance for

any one theme, although if the themes have been selected with care their balance may thus be disturbed The main difficulty lies in the arrangement of areal cover, some areas are presented in great detail and incur overlap, balanced world cover requires very careful planning The themes must be varied, over-emphasis on economic matters can occur It is particularly difficult to fit physical geography into this plan As there has been a world view throughout the course, revision by world regions is not a fresh approach, and some other layout is needed in the fifth year, perhaps that by continents

The regional syllabus is based on a study of the continents Emphasis on the word regional has led to some misunderstandings This plan does not imply the study of sub region after sub-region using formal headings This adult form of summary is seldom appropriate in school The major part of teaching uses the region, be it large or small, as a frame, laying emphasis on its chief characteristic The emphasis of study lies on the heart of the region, on those geographical conditions which give rise to its uniqueness We do not suggest that the regional plan provides the solution of all geographical problems Some are solved by wider study For example, the consideration of Sweden's hydro-electricity production involves issues which override regional boundaries, the dominance of New York as a port requires studies wider than those of the Atlantic seaboard or its hinterland The regional layout assumes that these and other such problems should be dealt with as they arise in the natural setting of the continent involved, it does not suggest that what is not regional shall be ignored In the same way the study of physical geography occurs where opportunity arises within the regional framework, glaciation is considered through a region offering the optimum examples, the work of the wind where its effects are most readily seen in the topographical features of a given area Thus the term regional geography is to be interpreted broadly rather than narrowly, yet it still insists that the synthesis implied in regional study is essential to geography even at school level

Details of a suggested regional syllabus appear on pages 289 to 303 We consider that the study of a continent or indeed of regions as such is unsuitable for children of eleven to twelve years of age, so that year one starts with the locality, the homeland, and selected environments overseas Year two sees study of South America, Australia (with New Zealand) and Africa, a

term being devoted to each. Year three is divided between North America and Asia, year four is concerned with Europe, and year five includes the British Isles and is a revision year which formulates a world outlook. If the course is based on four years' work only, it will be necessary to include some aspects of world study in the final year as a summary of the course. It is possible to allocate continents for study in years different from those here recorded, but there is some agreement that the southern continents are least complex in their illustration of man's adaptation to his environment, and thus serve best to introduce regional geography. The order of continents will be guided by the option selected for the public examination. It is common sense to defer study of the chosen special region until as late as possible. Apart from this, it seems best to leave the study of Europe, the most complex of continents, for the older child.

Planning the syllabus involves far more than the allocation of a continent to a particular year. It is within the framework of these continents that the real planning begins. The first problem is in the selection of what is considered essential for learning in the limited time available. The difficulty is always what to leave out rather than what to include. To ensure variety in teaching an order of presentation must be devised which does not entail, for example, half a dozen consecutive lessons on agriculture and a like block on industry. Allowance must be made for lessons which emphasise training in various skills such as the drawing of graphs, block diagrams, maps and sketches, and the interpretation of statistics. It is unlikely, for example, that an introductory lesson to North America along historical lines will involve work on climate graphs, whereas it might well entail study of growth of population from supplied statistics. A lesson on the Amazon basin will not necessitate the construction of a diagram of exports; this type of diagram would more profitably be included in a port study such as that of Rio de Janeiro, or in a revision lesson on Argentina. Similarly a topographical map of the Chilean desert area would be more suited to second year study than a similar map of the Andes. Again, time should be allocated for descriptive writing by means of essays planned carefully to be of increasing difficulty through the years.

For all these reasons it would seem that the carefully planned syllabus is based on lesson units, rather than on a list of regional or topic headings. To illustrate how these lesson units are to be selected, let us examine the processes in detail. One function of

the syllabus is to integrate the course, but in order to integrate it is first necessary to know the specific parts, we must analyse before we can synthesise We must decide on the salient features of the continent, and on the way in which these features can be made significant for the children we teach Thus if we consider, for example, South America, often the first continental study undertaken in year two, we analyse it to find what might be called its geographical highlights The historical factor is immediately apparent There are great contrasts in ways of life, varying from the primitive settlements in the upper Amazon to the modern civilisations in the towns, based on a Spanish or Portuguese culture There are also remnants of colonial empires in the Guianas The part played by the Andes attracts attention The original Conquistadores sought, as modern miners still seek, their minerals They remain a great physical barrier, and offer a striking example of the vegetation zones which result from variations in altitude The impact of oil on the wealth of Venezuela, with its remarkable and sudden development of an urban life for a fundamentally peasant population, cannot be ignored In Brazil, we see immensity and relative emptiness, in Chile, latitudinal variation and resulting climatic zones in Argentina, the dominance of Buenos Aires, linked by a railway network to the rich Pampas

These are a geographer's main impressions of South America, they must now be turned into lessons In terms of population and economic development Brazil with its seventy million people deserves emphasis, as does Venezuela, the second largest oil producer in the world Colombia could well be selected as a nice example of the effects of altitude in the tropics, the new Guyana on the grounds of its ties with Britain Of the mountain states Bolivia might be another selected example, evincing the problems of high altitude farming for these unsophisticated peoples, and of their resettlement in the Amazonian lowlands of their country The existence of Peru's riverine oases emphasises the desert of Atacama Chile, by contrast with Colombia, illustrates latitudinal effects on climate, drowned coastlines and the instability of the earth's crust Argentina provides an example of an agricultural area early commercialised, different from the subsistance farming areas of much of South America, and influenced by early foreign investment and the development of a railway net Lessons will be allotted to each of these areas according to their importance and the opportunities they provide for emphasising the various facets

of South America. There may well be no time for the study of Paraguay or other areas not mentioned. Nevertheless, the lessons devised to illustrate the essential characteristics of each of the given areas will present the spirit of South America. Suggestions for the actual lesson allocations appear on page 293.

A second way of planniog the syllabus is to analyse the continent concerned according to the opportunities it offers for the study of the various types of geography deemed necessary to present its balanced whole. For this type of analysis, let us take North America. North America is commonly taught in the first half of the third year, which means that some forty lessons are available. These are few in number for dealing with Canada, U.S.A., Mexico, the Central American states and the West Indies. Within this vast area there is no doubt that U.S.A. with its 180 million population merits the greatest allocation of time; the study of U.S.A., Mexico, Central America and the West Indies usually takes one term, that of Canada a half term.

A simple division of Canada and U.S.A. into regions will not necessarily ensure that all aspects of geography are taught in some degree. First, what aspects of physical geography suitable for study by third year children are present in North America, which can be linked by cross reference to their previous work on the southern continents? The ancient plateaux of Brazil and the Guianas have as counterpart the Laurentian shield; the fold mountains of Andes and Atlas can be revised and their study enlarged by work on the Rockies; similarly, the revision of volcanoes aod attendant features can be undertaken where examples occur. North America lends itself well to a study of the work of rivers; waterfalls, cataracts and rapids in Africa will have been mentiooed mainly along descriptive lines; this work will be reinforced by explanation of Niagara Falls, perhaps using High Force as a home yardstick. Another aspect of river work is exemplified by the Grand Canyon. It is in study of the Mississippi that the work of rivers can be dealt with as a unit, using real examples of meanders, oxbow lakes and a delta which can be contrasted with that of the Niger and other rivers. This work is built on the foundations of previous or parallel work on home rivers and others such as the Nile, and will in its turn form foundatioo for additional work towards the end of the year when the Hwang Ho and Yangtse Kiang are studied. Thus accurate generalisations and world patterns can be built up. A new topic will probably be that of the great ice-sheets and their

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Rockies This latter can be related to previous work on the Andes The literature available for descriptive passages of North America is exciting and plentiful—Edna Ferber's *Ice Palace* for Alaska and *Giant* for Texas, Marjorie McKinnon Rawling's *The Yearling* for Florida, Steinbeck's *The Grapes of Wrath*, which starts with a superb description of a dust storm and includes magnificent descriptions of California and other areas, James Morris's *From Coast to Coast*, which describes present-day traffic on the Mississippi, the dozens of westerns and thrillers which give flashes of vivid reality to what may otherwise be the devitalised skeleton of geographical summaries Children who are aware of even small extracts from these books will be helped in developing their own powers of self expression, and should be given every opportunity to do so

The final stage of completing the syllabus lies in the order of lesson presentation There are many ways in which the geography of North America can be arranged It is probably most simple to teach first that of Canada, since it has close ties with Britain, indeed a first lesson might profitably be spent examining these The study of U S A might be ordered historically, the opening up of the country being first considered, or the various regions of European settlement being examined in historical sequence Perhaps the main criterion should be that of variety The subjects selected will offer a sequence of different themes and skills within each sub-region or topic However it is arranged, each child should build up his personal record of the term's work on an outline map of the continent, which thus collates and consolidates his knowledge

The process of planning in detail the syllabus for North and South America has been given here as an example The full break-down of a five year course, based on similar principles, is given on pages 289 to 303 The table on page 290 should be particularly noted Our plan is basically regional, but the table shows how provision has been made for *planned incidentalism* (pages 290 and 291) A progressive scheme of work in the main systematic branches, and in field and map work, is shown, closely integrated into the main regional layout The tables given cover work for the first five years, work for the sixth form is considered in the next chapter

The syllabus given in detail is a full course in geography to O and A level for grammar schools or grammar streams The next group of children constitute the C S E band, these are

defined as of average ability. At the upper level they will be marginal to O level work; at the lower they should follow a course which does not entirely debar them from an attempt at the examination. It has been shown[3] that for any one subject this includes the fiftieth percentile, and to allow for late development could have rather more. It follows from what was said earlier that we believe these forms should follow a course which is in principle broadly similar to that already described It should be recognisable as geography, have a continental or areal layout, and include consideration and explanation of man's activities If these ideas are properly interpreted the sneer that some schools are doing merely watered-down O level geography is not valid.

There will be differences, of course. These children work more slowly and cover and remember less factual material Processes of thought offered them must be simpler. The syllabus requirements of the C S E boards vary and adjustments must also be made on this account. In practice there is often re-arrangement of classes within schools at the end of the third year The ability of the children is by then known, and teachers have the possibility of organising a two year course to the examination. This course should not start from zero It should be able to assume reasonable foundations This is particularly important for the general or world section commonly included in C S E requirements Special world studies, particularly of problems or problem areas, are sometimes made These will have little success unless there is modest background knowledge to build on

We offer therefore a possible arrangement of a two year course for the upper part of the school to follow the common core syllabus for the first three years The items for the C S E streams should be selected rather than condensed There may be selection with some regard for the particular interests of the regional board concerned, but in general we advocate the areal cover indicated This means that pupils will enter their fourth year with some knowledge of all the world (except any special regions to be studied later) and with some idea of geographical techniques and processes

The teacher must select boldly. For example only one of the farming studies in the second term might be attempted A whole continent could be omitted in year two, provided a lesson or so were devised to bring its existence to the notice of the children, and similarly, whole countries in year three A child who has

some understanding of the pattern of life in the tropics, gained from detailed studies of Africa, will not suffer if his knowledge of South America is scanty Similarly after study of one densely peopled monsoon land, brief reference only need be made to another There are other ways of thinning the large volume of material in the course detailed It is possible to choose single items from groups of items Whatever method is adopted, the principle of selection rather than epitomisation should be maintained

The problem of content for the least able children is perhaps the most difficult of all, and consideration has already been given to their needs They may well have fewer formal lessons They will certainly cover far less content, and their work will be more descriptive It can be seen that the programme of work given for the first year covers the locality, the homeland, and some lands overseas Such content, suitably modified, might form the basis of the plan for the first two years of work of these children The third year should enlarge their knowledge of the world by selected studies Two possible syllabuses for school leavers in their fourth year are offered They attempt to direct attention to the world these children are about to enter, and to aspects of it which are of interest or importance to them

NOTES

1 Long M An investigation into the relationship between interest in and knowledge of school geography ' M A., London, 1950

2 Briault, E H W and Shave, D *Geography in Secondary Schools* Geographical Association 1963, Chapter III

3 *The Certificate of Secondary Education Examinations Bulletin No* 1 H M S O, 1963, p 113

YEAR THREE · NORTH AMERICA (CALIFORNIA—REVISION LESSON)

AIM: To find out why so many people are moving to California.

MATERIALS REQUIRED:

(i) Atlases.

(ii) Individual copies of Fig. 45 and the following:

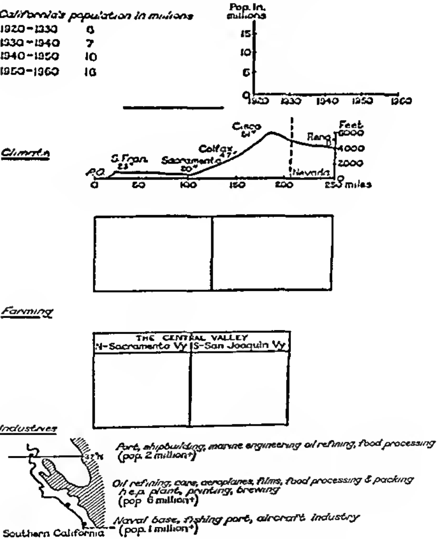

Fig. 45. Work sheet for lesson on California.

Many thousands of Americans settle in California each year They go because the west has weather which is generally and Some take up farming, especially in the Valley Most of them go to the coastal lowlands particularly to and because these towns have many and therefore there is work available

Farming in the Central Valley of California

[Copies provided, or read aloud]

The northern part of the Central Valley is the valley of the Sacramento River, where the unirrigated lands raise significant quantities of wheat and barley, along with sugar beet, in the production of which California leads U S A The chief grain grown nowadays, however, is rice, with more than 300,000 irrigated acres devoted to its cultivation Stock rearing of both beef and dairy cattle is important, with alfalfa and clover as the chief pasture crops This valley still remains, too, an important sheep area, the sheep being transported to the high Sierras for summer pasturing

The San Joaquin section of the Central Valley, with a growing season of nearly 280 days and irrigation water provided under the great Central Valley Project, is the leading cotton producing area of U S A outside the Cotton Belt itself In some recent years cotton has been California's most valuable crop But the most striking feature of farming here is its diversity Scattered through the area are dairy and poultry farms and market gardens, together with vast vineyards, olive groves and citrus groves Peaches, almonds and figs are grown in large quantities, whilst plums and other temperate fruits are located in orchards in the lower foothills of the Sierra Nevada

Method

1 Have learnt about California, this is to be last lesson about it. Look at duplicated sheet, what is the first thing it tells you about California? (*Population in millions*) The figures are given for periods of years—at what interval? (*Ten yearly*) In 1920 population was? (*6 million*) in 1960? (*16*) We are going to graph these figures Where will the first dot go on the vertical axis? (*Just above 5*) And on horizontal axis? (*Midway between 1920 and 1930*) Complete the graph The curve of the graph should touch the vertical axis—do you think the population before 1920 was less or greater than in 1920? (*Less*) So produce graph line slightly downwards to touch vertical axis What does the graph show? (*Marked increase in population*) Especially in which years? (*1950–60*)—Yes, so many people are going to California nowadays that U S.A Government is getting worried We are going to find out why so many people are moving there

2 Actually in England we have a similar problem Our Government is getting worried because so many people are moving—to which part of England? (*South and South east*) From which area are they coming? (*North*) Why do they come? (*To get work*) Yes, are better opportunities for work Why else do they come? (*Better weather*) They come to get work and hoping to find better weather

3 Let us think of California's weather What type of climate has California? (*Mediterranean*) What does a mediterranean climate mean? (*Hot dry summer, warm wet winter*) Is much more interesting than that sounds What is the chief feature of summer? (*Sunny*) Sun shines all day, and because it is dry there is no rain, so sky is free from? (*Clouds*) i e Bright blue sky with brilliant sunshine for months on end The rainfall in mediterranean lands is often about the same as London's? (*24 inches*) In what season does the rain fall? (*Winter*) So actually get as much as we get all the year round in the one winter season Yet people go to mediterranean lands for winter holidays—why? (*Because it is sunny*) If days are mainly sunny, but still have rain, how does it fall? (*In showers*) Yes, mediterranean winter rain falls in short, heavy showers

4 Now look at the section on your sheet Which are the two towns with rainfall roughly like London's? (*San Francisco and Sacramento*) Where is San Francisco? (*On coast*) And Sacramento? (*In Central Valley*) i e coastal lowlands and Central Valley have typically mediterranean weather—i e the west Now find Reno on your atlas—which state is it in? (*Nevada*) But this gives you the line of section What do you notice about the rainfall of the other towns? (*47 inches and 51 inches*) Why? (*Because rainfall is heavier up the mountain slopes*) Which mountains are these? (*Sierra Nevada*) Yes, heavier rainfall in mountains What is the height of Cisco? (*6,000 feet*) So what about temperatures here? (*Will be lower*) Have cooler summers and much colder winters How will much of winter rainfall occur? (*As snow*) Very heavy snowfalls in winter in the mountains—cars and trains get stuck To which part of California will most people go then? (*To the west*)—*yes, to the coastal lowlands and the* Central Valley Now in the two blocks in section 2 put headings (i) Coastal lowlands and Central Valley and (ii) Sierra Nevada, and write brief notes about the climate of each in small writing

5 Which occupation does weather affect most? (*Farming*) Which is the main farming area of California? (*Central Valley*) To remind you of farming, read the first printed paragraph What are the chief types of farming in the Sacramento Valley? (*Cereals, rice, beef and dairy cattle, sheep*) Put these types of farming in Sacramento Valley box Now repeat the exercise for San Joaquin Valley

6 What is the most striking feature of farming in the Central Valley? (*It is very varied*) Yet in spite of diversity, not a lot of people who go to California take up farming Why not? (*No money to buy land*) Land is particularly expensive—why? (*Because of irrigation*) There is work available on farms, especially in what season? (*Picking*) But this is seasonal work and may involve travelling about from farm to farm

7 Most people are not looking for jobs in farming, but for jobs in? (*Industry*) So will go to? (*Towns*) To towns in which part of California? (*The west*) Which are the big towns in the west? (*San Francisco, Los Angeles and San Diego*) Write in their names on the map, section 4 Section 4 gives their main industries—which two industries give a clue to the forms of power used? (*Oil refining and H E P*) Why are these used? (*H E P from the mountains, and oil from Los Angeles fields*) This oil is refined in which two towns? (*San Francisco and Los Angeles*) Which aspect of San Francisco do you think employs most people? (*Port*) Gives much work loading, unloading, repairing and so on—so underline port Which is chief industry of Los Angeles? (*Aircraft*) And second? (*Cars*) State of California has more cars than the whole of Canada Underline these two for Los Angeles, and notice that there are many other industries How does San Diego differ from the other two towns? (*It is a naval base and a fishing port*) How else does it differ from the others? (*It is smaller*) Population is? (*1 million plus*) compared with Los Angeles? (*6 million plus*) and San Francisco? (*2 million plus*) Actually these three towns and their suburbs contain more than half the total population of California

8 Conclusion To which of these towns will most of the newcomers go?—to which town in South east England do they go? (*London*)—so here they will go to? (*Los Angeles*) Particularly to Los Angeles and in a lesser degree to San Francisco This enormous surge of people to Los Angeles and the west coast is very worrying for U S A Government The real problem is how to supply all these people with the one essential they all must have? (*Water*)

Now fill in final paragraph [i e paragraph with blanks]

LESSON 20

YEAR FIVE · WORLD REVISION (RICE)

AIM: To account for the dominance of rice in South-east Asia.

MATERIAL REQUIRED:

(i) Atlases.

(ii) Duplicated maps, one of S.E. Asia showing rivers, unnamed, one of S.E. Asia showing main rice lands (Fig. 46).

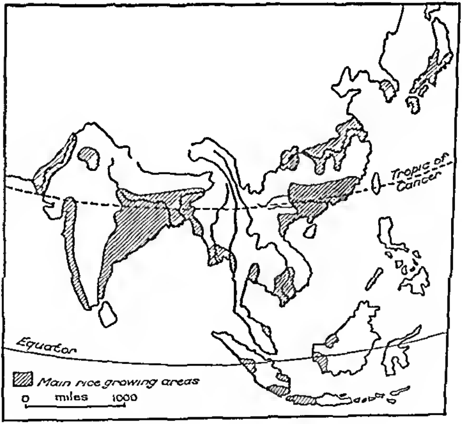

Fig 46 Main rice producing areas in South-east Asia

(iii) The following statistical tables (for board).

A Annual rice production in million metric tons.

B Population in millions.

C Annual trade in rice in million metric tons.

	A	B	C		A	B	C		A	B	C
Brazil	5			Indonesia	13	100		Thailand	9	28	1
Burma	7	24	1½	Japan	17	98		U.S.A.	3		
Cambodia	1	6		Laos	½	2		Vietnam (South and North)	10	23	
China	85	716		Pakistan	15	99					
India	48	458		Philippines	4	30					

METHOD

1 We are going to revise rice production today On the board is a list [A] of rice producing countries in alphabetical order Rewrite it in notebooks in order of importance Class then give order [for new board list]

Which is largest producer? (*China*) Bigger than India and Pakistan together? (*Yes*) Bigger than whole Indian sub continent Next? (*Japan*) These are the three major producers of rice What do you notice about the location of most of these countries? (*In Asia*) In what part of Asia? (*South east*) Which are two exceptions? (*Brazil and U S A*) So will ignore these for today—main rice producing areas of the world are in? (*S E Asia*)

2 We had best make sure that you know exactly whereabouts in S E Asia they are Using your atlas, on the blank outline map name all the countries mentioned Don't bother with boundaries, just write names in correct places

3 Look now at map of rice growing areas What do you notice about their location? (*Are on the coast*) Look in your atlas—what part of coast? (*In coastal plains*) [Put on board] Look again—only on plains? (*No, also on highland*) What do people do in order to make highland cultivation possible? (*Make terraces*) [Add to board] If you compare your two printed maps, you can add information about location? (*In*

BOARD SUMMARY

Where rice is grown

(i) Coastal plains

(ii) Terraced highlands

river valleys.) And not only in valleys, but at river mouths on? (*Deltas.*) Have said river valleys: in order to know which, using atlas name all the rivers on blank outline map. Check correct—they are? (*Indus, Ganges, Brahmaputra, Irrawaddy, Salween, Mekong, Sikiang and Yangtze Kiang.*)

(iii) River valleys
(iv) Deltas

4. Have found out where rice is grown. Now write down in notebooks what you remember about how rice is grown. First? (*Ploughing.*) [Add to board by class questions. It is normally necessary to remind class of (ii) nursery beds and (iv) that land needs draining before harvest. This emphasises need for water.] Check that you have complete summary in notebooks.

How rice is grown
(i) land ploughed (water buffalo)
(ii) rice in nursery
(iii) transplanted in mud
(iv) land drained
(v) harvested by sickle
(vi) threshed

5. You have told me about the work necessary—we need to find out when all this is done? [Class normally unsure.] Will need to find out about climate. I will dictate the temperature and rainfall figures of some stations, so put the initials of the months of the year right across a page of your notebook.

[Dictate figures once only, as quickly as class can write.]

		J.	F.	M.	A.	My.	J.	Jy.	A.	S.	O.	N.	D.
OSAKA . .	°F.	39	39	45	56	64	72	79	81	74	62	57	43
	ins.	2·2	3·6	4·3	5·9	6·3	8·2	7·1	7·5	7·2	4·3	4·3	2·3
SHANGHAI .	°F.	38	39	46	56	66	73	80	80	73	63	52	42
	ins.	2·8	2·0	3·9	4·4	5·3	6·6	7·4	4·7	3·9	3·7	1·7	1·3
SAIGON . .	°F.	78	79	80	82	82	80	80	79	80	79	79	78
	ins.	2·2	1·9	2·7	5·6	7·3	13·1	12·9	11·1	14·7	12·2	4·9	3·1
SINGAPORE .	°F.	78	79	80	81	82	81	81	81	80	80	79	79
	ins.	8·5	6·1	6·5	6·9	7·2	6·7	6·8	8·5	7·1	8·2	10·0	10·4

Now locate these places on your printed map first, before we use the figures. Rice needs $3\frac{1}{2}$–4 months with temperatures not lower than

68° F (or 70° F) and ample water Underline the growing season for rice in Osaka Planted in? (*June*) Harvested? (*September*) This gives one crop Now look at Shanghai Underline the growing season Planted? (*June*) Harvested? (*September*) Again one crop How about ricelands around Saigon? Planted? (*April*) Why not March? (*Temperature is high enough, rainfall isn't*) Harvested? (*July*) And then? (*Can plant second crop*) For growing season? (*August to November*) So areas in South can get two crops Now look at Singapore area? (*Can get at least three crops*) Yes, climate near Equator is right for whole year So when is all the ploughing, transplanting, harvesting done? (*It depends on where rice is being grown*) It depends on location of rice area

6 Have found out where, how and when rice is grown Now let us find out why [Add population figures (B) and export trade figures (C) to board] What do you notice about trade in rice? (*Very small*) What do you notice about population of these lands? (*Very high*) So why is trade small? (*Because people eat it where it is grown*) Yes, it is the food crop [Start board summary] Why do they grow rice rather than other cereals? (*Because climate suits it*) Yes, rice responds well to high temperatures and rainfall Responds so well that in southern areas get? (*More than one crop*) And what is important about the type of land available? (*Likes flat land*) Yes, flourishes on alluvium If land not flat? (*Terrace*) Rice also gives high yield per acre. Wheat gives? (*15 35 bushels per acre*) Rice gives 80 bushels—high yielding crop necessary Why? (*To feed all Asia's teeming millions*)

7 Conclusion For all these reasons, rice is the dominant crop of S E Asia See that you have them down in your notebooks (*From memory*) Then check with board

Homework Class to find out about rice production in Brazil and U S A, and see if it differs from that of S E Asia

BOARD SUMMARY

<u>Why rice is grown</u>

(i) for food
(ii) responds to high temperature and rainfall
(iii) several crops from same land in some areas
(iv) flat land is available or terraces made
(v) high yield per acre—80 bushels
(vi) needed for huge population

GRAMMAR STREAMS

YEAR ONE Selected Environments local, homeland, world

TERM I

1 Class draw map of geography room to scale (measurements provided)

2 Class draw maps of way to geography room from other parts of school

3 Class pace school grounds and map to scale

4 Ways of finding direction (insertion of north on previous maps)

5 Making a simple compass

6 Observations of the weather—wind and wind direction.

7 How to measure temperature and rainfall

8 A weather chart—organisation of simple daily record

9 Observation of the sun (measurement of shadows)

10 Why there is day and night (simple explanations—London, cf Calcutta, New Orleans)

11 Land use in school area—factory, shop, transport, social and home facilities (Homework collect information for small area near home)

12 Class map land use on 1" O S base map (individual information added)

13 Study of geography provided by 1" O S map, learning symbols

14 Further study of different 1" O S map to learn different symbols

15 Introduction to contours by use of simplified Admiralty Chart (page 65)

16 Outdoor lesson using local topography to demonstrate contours

17 Simple hill contours and section (using real example, page 56)

18 Further interpretation of contours from O S map (comparison with simple base map)

19 Further interpretation of contours from another O S map

20 Study of a local stream

21 River features (real examples, to increase geographical vocabulary)

22 Study of a coast (to increase geographical vocabulary)

23 Revision what have we learnt about our weather?

24 Revision what does the 1" O S map tell us? (Select simple map)

THE INTEGRATION OF A SYLLABUS

	Year I British Isles and selected environments overseas	Year II Southern Continents	Year III North America and Asia.	Year IV Europe (including basic British Isles)	Year V British Isles World Revision
Field Work	Simple land use in local area Half-day excursion to farm or market	Assessment of local population density Half-day excursion to study vegetation or local water supply	Stream or river study Half-day or whole-day excursion for rock and soil study Development of field sketches	Whole-day excursion to study land use in relation to structure Possible farm visit or village survey	Two whole-day excursions (i) traverse across scarp and vale, (ii) urban and village survey
Mapwork	Maps as sources of information about local and home areas Map reading for symbols and contours Insertion of information on provided outlines	Topographical map study e g Pampas Relation of contours to relief of atlas map Layer colouring Section drawing e g African Rift valley Vegetation in relation to altitude Children begin own maps of e g crop areas, vegetation areas, ports, population, H E P sites	Study of rivers and features, e g falls, meanders oxbows deltas from topographical and O S maps Children continue to develop their own mapping skills e g to show crop distributions port and town sites, H E P sites Simple study of land use map	Recognition of features from O S maps and topographical maps, e g glacial Study of large-scale maps, e g polderlands, Lombardy plain, Hamburg Children adapt text book maps or improve them Also draw own town site, communications maps with the minimum of direction Construct own simple land use map	Revision of all aspects of 2½" and 1" O.S map study Analysis for subdivision into regions, or for distribution patterns. Learn to relate photographs to O.S maps Children can now select facts necessary for drawing maps to illustrate given purpose Simple study of synoptic charts
Physical Geography	Recognition of valleys, plains hills, plateaux, mountains in field, map or photograph as basic minimum Other features e g headlands, bays, deserts as opportunity arises Some awareness of slope The Continental Shelf	Fold mountains Volcanoes and earthquakes Rift valleys Geysers Desert features Water table and artesian basins Fiords, glaciers —all of real examples arising from regional studies	Rocks—sedimentary, igneous, metamorphic Canadian Shield Appalachians Oil. Simple structures e g anticlines and synclines The work of rivers —all of real examples arising from regional studies	Glacial erosion and deposition in highland and lowland areas Mountain types—revision folds; also blocks Vosges, Eifel or Central Massif Limestone scenery Weathering Influence of structure on land use —all of real examples	Revision of physical geography by systematic study based on known examples particularly from the British Isles

Climatology	Simple weather observations. Measurement of temperature and rainfall Simple records.	Simple temperature, rainfall, wind and cloud records. Introduction of isohyets of Australia Insolation. Simple descriptions of tropical climates	Contrasts between Arctic air and Tropical air Influence of continentality Chinook Hurricanes. Development of fog round Newfoundland Information for N America collected from daily weather charts. Land and sea breezes. Monsoons.	Tc, Pm, Pc air masses. Cloud. Use of daily synoptic charts. Use of newspaper, radio and T V weather data. Climates of Europe	Weather associated with depressions and anticyclones. Simple analysis of synoptic charts. Revision of climates.
Bio-geography	Recognition and naming of common trees and plants. Simple soil and climate requirements of wheat, barley, oats, sugar beet. Natural vegetation of, e.g., heath, moor, rough grassland bog of Highlands of Scotland, or Pennines. Fish and plancton	Photographs and descriptions of plants not available for first hand study to enable recognition of equatorial forest, desert vegetation, and savanna, with response to climate and soil. Coral. Interesting fauna	Development of vegetational response to climatic and soil conditions, e g tundra coniferous forest and monsoon forests of Asia Vivid verbal and pictorial representation. Some study of fauna, e g fur bearing animals.	Revision of tundra and coniferous forest Reasons for re afforestation by pine, etc Detailed study of response of mediterranean vegetation to soil and climate Study of relationship between soils, climate and crops in areas where little natural vegetation remains.	Revision of world patterns of vegetation distribution, linked with climate and soils. Study of specific aspects, e g conservation, soil erosion, malaria, other pests.
Mathematical Geography	Day and night Use of latitude and longitude without explanation. Simple survey	Latitude and longitude explained. Unequal lengths of day and night in north and south hemispheres. Insolation (with climate)	Arctic and Antarctic circles, why there are 'sunless' seasons. Time zones. International Date Line	The effect of latitude on the amount of daylight in the seasons. Possible drawing of two very simple map projections to explain varied graticules of atlas.	General study of the earth's relation to the sun, for revision of effects on seasons, daylight, and time
Economic and Human Geography	Types of farming in the British Isles Simple examples of industry, e g coal-mining, iron and steel, textiles A town A large port Comparisons with oversea areas	Farming in the tropics— (i) subsistence, (ii) plantation. Cattle rearing Sheep rearing Mediterranean fruit production. Irrigation— (i) primitive, (ii) modern, e g Aswan, Snowy River Problems of tropical Australia Racial problems in Africa.	Contrasts between large-scale planned farming and peasant farming The influence of oil The production of H E P Revision of irrigation, including different methods. The problems of flood and soil erosion. Problems of over population.	Influence of underlying rocks on land use Influence of man on landscape — (i) industrial, e g Ruhr (ii) agricultural, e g polders. Influence of raw materials, e g on development of industries in ports.	Revision of types of landscape— (i) cold desert to equatorial forest, (ii) agricultural and industrial in selected areas. Revision of power resources, water resources and main communications of world World distribution major crops, and minerals. Review of population distribution and world pressure points.

TERM II

1 Life on a Kentish fruit farm (Association of Agriculture farm study)
2 Fruit farming in Kent (seasonal diagram) or class visit to local farm or market
3 Where our milk comes from (film or sample study)
4 Contrasts between chalk and clay lands from study of 1" O S map
5 Land use contrasts in South east England (class complete simple outline map showing chalk, sandstone and clay lands)
6 Forms of power
7 How coal is mined (open cast and shaft diagrams)
8 Study of coal mining area by means of 1" O S map of South Wales
9 Coal mining in Britain
10 By products of coal (class drawing)
11 How iron and steel are made (diagram of blast furnace and steel plant)
12 The British iron and steel industry
13 A wheat farm in East Anglia (sample study)
14 The wheat farmer's year (calendar)
15 Norwich—study of a market town (by map and picture)
16 Fishing off the British Isles
17 The main fishing ports of the British Isles (class map on provided outlines)
18 The main fishing areas of the world (class map on world outline)
19 A sheep farm in Wales (film or sample study)
20 A sheep farmer's year (calendar)
21 A sheep station in New Zealand (by contrast)
22 From sheep station to woollen cloth (manufacturing processes in brief)
23 Revision what do our records tell us about this term's weather?
24 Revision what is meant by a port, a capital city, a market town?

TERM III

1 Outdoor lesson measurement of local park (by pacing or simple chain survey)
2 Class map of local park—emphasis on why it is left as open land
3 The Pennine moorlands—what they are like (using 1" O S map)
4 How man uses them (group work with pictures)
5 Crofting in the Scottish Highlands
6 Regional planning for the Highlands

7 A Galway farm life in another region of difficulty
8 Alaska modern life in a more difficult region (picture study to show what Alaska is like)
9 How man lives in Alaska
10 Rubber from Malaya (film or sample study)
11 What the equatorial forest is like (descriptive passage showing climate and vegetation)
12 Primitive life in the equatorial forest
13 Why day and night are of equal length at the equator
14 Life in a Canadian lumber camp
15 What happens to the timber
16 The Sahara how deserts are formed (very simple explanation)
17 A Saharan oasis (study of topographical map)
18 Revision a map to show where people we have learnt about live (world outline provided, key cold desert, coniferous forest, temperate lands, hot desert, equatorial forest)
19 Revision where our wool comes from (simple statistics of imports)
20 Revision where our wood comes from (class draw simple bar diagram of imports)
21 Why London is our greatest port (where docks can be built, using P L A map and filmstrip)
22 London's markets
23 How to see London (historical using L T B and Underground maps)
24. Revision our weather (analysis of year's records)
25 Revision what atlas maps and O S maps have in common (including aspects of geography about which no information is given)

YEAR TWO

TERM I South America
1 Past and present influences in South America
2 Why parts of the Amazon basin are still unexplored (organisation of daily temperature, rainfall, wind and cloud record for comparison with other weather)
3 How people live in the Amazon basin
4 Sample study of a coffee fazenda
5 Why coffee is important in Brazil (class map coffee areas and export routes)
6 Rio de Janeiro (class draw sketch map)
7 Industrial south east Brazil
8 Problems of Brazil s empty lands
9 What is meant by latitude and longitude

10 Venezuela—the impact of oil
11 1" O S map study of part of East Anglia (to emphasise topography)
12 Sample study of an estancia (page 108)
13 Cattle rearing in the Pampas (topographical map study, class map cattle areas)
14 Buenos Aires, trade to discover other produce of Argentina (class draw bar graph)
15 Revision lesson railway journey from Buenos Aires to Valparaiso
16 Division of Chile into three regions (from picture study)
17 Why most people live in the Central Valley (class graph climate statistics of Santiago)
18 The formation of the Andes
19 Life at high altitudes in Bolivia
20 The problem of water supply in Peru (page 84)
21 Revision the minerals of South America
22 Revision the advantages and disadvantages of the Andes to man
23 Revision simple population distribution map made up by class, on basis of where too hot, too cold, too dry, too wet, etc, to live)
24 Communications in South America (including Panama Canal)

TERM II Australia and New Zealand
1 Discovery of Australia and New Zealand (map of sea voyages)
2 Exploration of Australia (map of main journeys)
3 Why the Southern Hemisphere has many hours of daylight when the Northern Hemisphere has few
4 A sheep station (sample study)
5 Sheep production (class map sheep areas and export routes)
6 Queensland problems of tropical Australia
7 Beef cattle rearing in Australia (with areas mapped on tracing paper for comparison with sheep areas)
8 Flora and fauna (including coral formation)
9 Minerals of Australia (page 44)
10 Coal mining and industrial development
11 Why Western Australia has low population density (map of Great Australian Desert, with isohyets and winds)
12 Water problems of Australia (artesian basins diagram)
13 Irrigation in Murray Darling area
14 The Snowy River project
15 and 16 Half-day visit to local Water Board plant, or local vegetation study
17 South-eastern coastlands why most people live there.

18 Transport in Australia (map to show main road, rail, air and coastal shipping routes)
19 Revision Australia's trade (class draw column graphs)
20 Revision population problems of Australia
21 Outdoor lesson to attempt to assess local population density
22 New Zealand interesting physical phenomena, detail of a volcano included
23 The produce of North Island
24 Contrasts in South Island
25 Why people emigrate to New Zealand
26 Revision the major natural regions of Australia (unnamed map of regions provided)
27 Revision to discover common features in the millionaire cities of Australia and S America
28 Antarctica—its problems (including insolation)

TERM III Africa
1 Introduction why the Dark Continent? (including main exploration)
2 Congo basin can this be developed? (Outline map of Africa provided for mapping vegetation, to be developed through term)
3 Transport in the Congo basin (map of river, road, rail and air routes)
4 West Africa sample study of a cocoa farm
5 A map to show export centres for cocoa and oil palm areas
6 Sample study of a north Nigerian farm (by contrast)
7 What life is like in the savanna lands (generalisation)
8 The mineral wealth of West Africa
9 The Sahara how are deserts formed? (three main types and oasis formation)
10 Contrasts in Arab life settlers and travellers
11 North west Africa why most people live near the coast (section north south)
12 The mineral wealth of North Africa
13 The Nile Basin—why the Nile flows (map, with rainfall and flood data)
14 Why most people live in Egypt—irrigation methods
15 Summer and winter crops of the Nile valley
16 The value of the Suez Canal
17 East Africa—the great Rift Valley (class draw section across topographical map)
18 Different kinds of life at different altitudes (study of topographical map)

19 The Kariba Dam
20 South Africa the importance of minerals (location map given)
21 South Africa's other wealth—agriculture
22 Study of 1" O S map of a river, e g the River Trent.
23 The Orange River project
24 Cape Town (site, climatic statistics, trade)
25 Revision can you locate these climate stations? (given statistics for equatorial, savanna, mediterranean and desert types).
26 Revision racial problems in Africa

YEAR THREE North America and Asia

TERM I
1 Introduction why learn about Canada
2 Can man develop the tundra? (why sunless season, vegetation map of N America started on given outline, to be developed throughout term)
3 Coniferous forests in winter lumbering and trapping
4 Coniferous forests in summer timber industries, tourists, fire, reafforestation
5 The Prairies sample study of a wheat farm
6 Why spring wheat is grown (effect of weather on human life organisation of daily record of N American weather taken from daily synoptic charts)
7 How produce is exported (class map routes)
8 British Columbia how man uses the land (farming and minerals)
9 How man uses the waters (irrigation, salmon fishing, Kitimat H E P)
10 Contrasts between Vancouver and Montreal.
11 Minerals of Canada (inserted on outline map provided)
12 C P R (using timetable time zones)
13 Newfoundland why farming is difficult (study of topographical map)
14 The influence of ocean currents (extended to Atlantic and Pacific oceans)
15 United States Links with Canada, Britain and the rest of the world
16 New England States—how historical factors have influenced present developments
17 The iron and steel industry why Pittsburgh is a centre.
18 Why St Lawrence-Great Lakes borderlands are densely peopled
19 Revision Great Lakes-St. Lawrence seaway (trade and obstacles)

20. The Corn Belt: sample study of a farm.
21. Why Chicago is the Corn Belt centre (map).
22. Cattle rearing in the High Plains (link with Corn Belt).
23. Florida—the influence of geology.
24. Why New York is the chief port of U.S.A. (class map routeways).
25. Why New York is a great industrial centre.

TERM II

1. The Cotton Belt: life and work on a cotton plantation.
2. What happens to the cotton (map of Cotton Belt: Fall Line: cotton manufacture and export).
3 and 4. Outdoor lesson on local stream.
5. T.V.A.: need for controlling rivers.
6. The Mississippi: the work of rivers (class study topographical map).
7. Are deltas of use to man? (page 251).
8. Revision: how man uses the natural resources of the Mississippi Basin (trade).
9. Oil production in U.S.A.
10. California, state of contrasts.
11. The Central Valley.
12. Why so many people move to the west coast (page 281).
13. Mexico: different kinds of life at different altitudes.
14. The population problem of the West Indies.
15. Revision: how man uses mountain resources in N. America.
16. Revision: how man uses rivers in N. America.

Asia

17. India—subcontinent of great variety (page 82).
18. A rice farmer's year (emphasis on seasonal rainfall).
19. What other cereals are grown? (four small unnamed maps, annual rainfall, rice, wheat and millet areas for comparative purposes).
20. Land of famine? (descriptive detail monsoon climate, temperature and rainfall figures of two contrasting stations).
21. Revision: irrigation in India and Pakistan (class map types of).
22. Village life in India and Pakistan (using line diagrams of two contrasting types).
23. Town life: Bombay compared with Calcutta (class draw route maps).
24. Revision: contrasts between India and Pakistan (modern developments).
25. Ceylon: is it rightly named 'island of dark green leaves'? (section across Ceylon drawn from descriptive passage).
26. Tea production (sample study).

TERM III

1 Oil in S W Asia (map of locations provided for annotation)
2 Excursion for rock and soil study, with field sketching
3 China—use of population map to show where most people live (class map lowland areas, main rivers and highlands)
4 N China—the Hwang Ho basin (communal farming in)
5 S China—the Sikiang basin—why the south is richer than the north
6 C China—the Yangtze Kiang basin—contrasts in urban and rural settlement
7 Recent industrial development in China
8 The geographical background of the problems of Indo-China
9 Study of Land Utilisation Survey map (e g of Pennines)
10 Malaysia rubber production (using land use map, e g Kalumpang area)
11 Singapore, port for Malaysia and Indonesia (local and international trade)
12 Why Java is so densely populated (coast to coast section across a volcano)
13 The mineral wealth of South east Asia (including Burma)
14. Revision transport difficulties in South east Asia
15 Japan a Japanese buraku (sample study)
16 Agriculture in Japan
17 Industry in Japan
18 Revision—why most Japanese people live south of 37° N
19 U S S R.—modern development of Arctic Russia
20 Land use in the Soviet Far East (development of natural vegetation map)
21 What the Steppes are like (page 118)
22 The Khirgiz of the Steppes
23 Mineral development in U S S R in Asia
24 The Trans Siberian Railway (use of timetable for revision of time zones)
25 Revision Asia, land of contrasts (emphasis on climate, using year s records as a yardstick, and natural vegetation map)

YEAR FOUR Europe

TERM I

1 Structure and physical features (outline map provided)
2 Climatic divisions (based on previous knowledge, using typical statistics)

3 U S S R —natural vegetation regions
4 Leningrad and Moscow regions industrial geography
5 Agriculture and industry in Ukraine
6 Revision port contrasts in U S.S R

Suggested early in course to link with study of U S S R in Asia at end of Year Three.

7 Map study 1" O S map fiord area
8 Norway the influence of the sea
9 Geographical factors affecting land use
10 Studies of Bergen, Oslo
11 Sweden division into four major regions by means of pictures (class map)
12 Forestry
13 Mining and industry
14 Town studies Stockholm, Goteborg, Malmo
15 Revision comparison and contrast of Norway and Sweden
16 Denmark the effects of glaciation
17 Why dairy farming dominates
18 Industry in Denmark
19 Urban geography of Denmark
20 The Netherlands—land reclamation
21 Intensive farming (study of topographical map)
22 Port studies Rotterdam Amsterdam
23 Revision contrasts between east and west
24 Revision the effects of ice-sheets in northern Europe (map to show limits of)
25 Revision land use regions of northern Europe (beginning map to be completed later)

TERM II

1 Belgium—why so densely peopled? Farming (Class draw simple geological map)
2 Industrial geography (class map coalfield and industrial centres, (page 96)
3 Luxembourg contrasts between the Ardennes and the Bon Pays
4 France Brittany, the influence of the sea (page 38)
5 Central Massif geology map and pictures
6 Rhone valley and Mediterranean coast
7 Donzère Mondragon barrage or Languedoc lower Rhone irrigation project
8 Aquitaine—land use
9 Town studies—contrast between Bordeaux and Marseilles
10 The industrial wealth of Lorraine
11 Paris Basin (geological section drawn to show land use, page 409)
12 Paris natural centre of France
13 Revision industry in France

14 Germany agriculture in the north German plain (using topographical map)
15 Town studies the importance of Hamburg and Berlin
16 Regional features of the Rhine basin (pictures to show alpine valley, rift, gorge, plain and delta class map, annotated)
17 Contrasts between the rift valley and the Rhine gorge (using topographical map)
18 Industrial geography of the lower German Rhinelands
19 Uplands of central and south Germany
20 Revision reasons for distribution of population in Germany
21 Switzerland effects of glaciation in a highland area (diagrams of real examples of typical glacial features)
22 Study of topographical map or 1″ O S map of glaciated area
23 Land use in three major regions of Switzerland
24 Industry in Switzerland
25 Revision railways in relation to relief
26 Revision H E P in North west Europe

TERM III

1 and 2 Outdoor lesson, constructing L U S map of locality
3 Iberia climatic contrasts (build up of relief map)
4 Land use in Iberia
5 Town contrasts Lisbon, Madrid, Barcelona
6 Spain industrial geography
7 Portugal the influence of topography
8 Italy the Alps and Apennines contrasted
9 The Lombardy plain an agricultural unit (study of topographical map)
10 Towns of the Lombardy plain (town site maps, revising mountain passes)
11 Mediterranean coastlands of
12 Study of 1″ O S map karst area, e g Mendips
13 Yugoslavia threefold division by means of topographical maps and pictures
14 Greece problems in the development of
15 The importance of waterways in
16 The Danube Basin (pictures to show alpine valley, Alfold, gorge, plain and delta) (Class map, annotated)
17 General revision climatic divisions—what do climatic statistics really mean? (using records kept)
18 The wheatlands of Europe (including the British Isles)
19 Heavy industrial regions of Europe (including the British Isles)
20 The characteristics of mediterranean agriculture
21 Contrasts in coastal landforms (study of O S and topographical maps)

22 The effects of glaciation on scenery in Europe
23 How man uses rivers in Europe
24 Land, sea and air routes of Europe (outline map provided, class insert main rail, cross Channel routes and air ports).
25 After examinations, work could be on mathematical geography, including revision and final study of the seasons

YEAR FIVE British Isles World Revision

TERM I

1 Main structural features of the British Isles (class map on provided outline)
2 Measuring temperature and rainfall (synoptic chart symbols)
3 Measuring pressure (synoptic chart symbols)
4 Cyclones and anticyclones
5 Study of typical depression on synoptic chart
6 Anticyclonic conditions shown on synoptic chart
7 Climatic quadrants of the British Isles
8 Preparation for local study or study of more distant area Followed by day in the field
9 Follow up of field studies.
10 Ireland natural conditions
11 Farming in Ireland (using dot distribution maps)
12 Town studies Belfast and Dublin
13 Wales characteristics of Snowdonia (by study of 1" O S map)
14 Occupations in north and central Wales (introduced by study of population map of Wales)
15 Why most people live in South Wales (industrial development of South Wales coalfield)
16 Scotland the Highlands, physical phenomena
17 Regional planning for the Highlands
18 Central Lowlands structure, relief and drainage (including revision of rift valleys)
19 Coalfields and industries
20 Why most people live in the Central Lowlands (agriculture and revision of industry)
21 The Southern Uplands routeways
22 England the Pennines structure, relief and drainage
23 Contrasts between carboniferous limestone and millstone grit areas (by study of 1" O S map)
24 Revision advantages and disadvantages of Pennines to man (by study of L U S map)
25 Lake District effects of glaciation (by study of 1" O S map and pictures)
26 The natural regions of Cumberland, Westmorland and north Lancashire

27 Lancashire factors influencing the present position of the cotton industry
28 Modern industries in Lancashire
29 Town studies Liverpool, the Merseyside conurbation, Manchester, Blackpool
30 Agricultural specialisation in the Midlands
31 The North Staffordshire coalfield the Potteries
32 Other industrial specialisation in the Midlands
33 River study the River Trent or the River Severn (by study of 1" O S map)
34 The fishing industry natural conditions, fishing grounds and ports (outline map provided)

TERM II

1 Northumberland and Durham coalfield (using dot distribution map of collieries)
2 Industries of the North East
3 Study of 1" O S map North York Moors—Vale of Pickering—York Wolds sheet
4 York, centre of agricultural Yorkshire
5 York Derby, Notts coalfield (revision of Pennine structure)
6 The woollen industry
7 Other examples of industrial specialisation
8 Revision Hull, hinterland and trade (using column graphs imports and exports)
9 East Anglia and Fenland natural conditions
10 Land use in
11 How chalk and clay structure affect scenery (study of 1" O S map)
12 Structure of South east England (class draw section)
13 Land use in South east England
14 Town studies Guildford, Brighton, Dover
15 London basin why high population density
16 London
17 The Hampshire basin
18 Town studies Southampton and Portsmouth
19 Coastal features (study of 1" O S map Swanage and pictures)
20 Other coastal features (e g Slapton Sands area, Devon and rias)
21 South west Peninsula structure relief and drainage
22 The influence of physical geography on agriculture
23 Urban geography of the South west Peninsula
24 Revision the English scarplands (emphasis on scenery 1" O S map and pictures)
25 Revision mineral resources of the British Isles (rock types)
26 Planning land use in Britain

World Revision

27 Reviewing rocks igneous, sedimentary, and metamorphic.
28 Mountain making. faulting and folding, rift valleys and synclinal mountains
29 The work of rivers.
30 The work of ice
31 Lakes methods of formation
32 The wind as a modeller of the earth s surface
33 The work of the sea erosion (and submergence)
34. The work of the sea land building (and emergence)
35 The ocean currents (revision of major wind systems)

TERM III Revision

1 Full day's field excursion Work to include field sketching and traverse
2 Arctic and Antarctic regions
3 The hot desert lands (by contrast)
4 World oil resources.
5 Coniferous forest lands
6 Equatorial forest lands (by contrast)
7 The use of rivers
8 The mediterranean lands
9 The savannas problems of development.
10 Why South-east Asia produces so much rice (page 285)
11 Millionaire cities
12 World production of wheat
13 Other ways in which man uses temperate grasslands
14 Why there are empty lands
Other lessons before the examination for individual revision

Post Examination Work Individual or group work on topics such as
1 Geographical background to the problems of major areas of unrest
2 Reafforestation
3 Recent expeditions and their value to mankind
4 The agricultural services of U N O
5 Recent additions to the power supplies of the British Isles
6 'This Changing World —developments in any one continent

Note It is assumed that fifth form geography lessons occur thrice weekly, with two periods of homework Although homework is not suggested in the syllabus, it is advocated for purposes of consolidation, revision and for finding new information Its setting should be as an integral part of the lesson plan

A Two year Syllabus for C S E Examination Work

The existence of many regional Boards each with a different syllabus for the Certificate of Secondary Education examination makes it impossible to produce a single course common to all The syllabus given here, however, offers a pattern which can be adapted to the specific requirements of most Boards It is devised to provide a course of study for an examination syllabus which includes the following items (A D) Such items appear in the regulations of most Boards. One cannot merely take each section of an examination syllabus and teach it *en bloc* It must be woven together into a connected course. The detailed programme (pages 305–311) offers an attempt at such a working translation

A The presentation of a written topic study or a field study notebook.
B O S map work (2½" and 1")
Selected regions of the British Isles
C Elementary meteorology
Landforms—fold mountains, block mountains, rift valleys, volcanoes, plateaux, plains
Earth sculpture—the work of ice, rivers and the sea
The natural regions—equatorial forest, savanna, monsoon, hot desert, mediterranean, temperate lands, coniferous forest, tundra
The chief commodities—wheat, rice, coffee, cocoa, tea, meat, wool, rubber, oil
Latitude, longitude, day and night, the seasons
D World problems
Special regions—Brazil and Japan

The course has been based on a time allocation of four lessons a week This should give more than forty lessons in an average term. The syllabus is devised for five terms, as the examination is held at the beginning of the sixth term Work for the rest of the sixth term could be along lines suggested for a study of Europe for school leavers, or a study of U S A or U S S R

The working syllabus given in full is based on the selection of Brazil and Japan as special regions, and on South east England as the home district South America is therefore used as a vehicle for many aspects of geography, and would be the continent largely omitted from the second school year. Similar considerations apply to the treatment of Asia The block of twenty lessons given to local study

and South-east England in the second year can be changed according to the local area. Most Boards require topic work. Some provision is made for supervision of this in class, but it is assumed that some of the work would be done in the pupil's own time.

The syllabus is also presented in order to show how we would implement our ideas on integration. Physical geography is dovetailed with regional geography, and areal study by continents is used to provide a specific framework for particular topics. The work suggested offers variety; it avoids the study of a series of products or natural regions one after the other, which children may confuse. At the beginning of the two year course they are given the Board's syllabus, and should tick off for themselves the matter as it is covered. They will thus see how the work is progressing.

YEAR FOUR

TERM I

1. The examination—duplicated copy of examination syllabus for each child.

2. How to present work on an individual topic—instruction sheets issued. Children's decisions as to choice of topic dealt with individually by appointment.

South America (including special region, natural regions, commodities and landforms).

3. The mountains, plateaux and plains (outline map provided for insertion of).
4. How the Andes formed (detail of fold mountains).
5. An Andean volcano (diagram of).
6. What the Andes look like.
7. How man uses the Andes.
8. Supervision of individual topic work.
9. How oil occurs (one simple formation).
10. The importance of oil to Venezuela.
11. A timed examination question.
12. What the Amazon basin climate is like (temperature and rainfall graph).
13. Vegetation of the Amazon basin (vegetation map of South America started).
14. How people live in the equatorial forest.
15. Where people live in Brazil (population map for class analysis).
16. How coffee is produced.
17. How coffee is exported (class map coffee area and export routes).

18 The industrial south east

19 Could more people live in the empty lands of Brazil?

20 Supervision of individual topic work

21 A timed examination question

22 What the Pampas are like (addition of temperate grassland to vegetation map)

23 How the climate affects life in the Pampas (temperature and rainfall graph given)

24 Cattle rearing in the Pampas

25 How meat is exported (class map cattle area with export routes)

26 Other products of the Pampas

27 The Atacama Desert (addition of desert vegetation to vegetation map)

28 The millionaire towns of South America (map of world provided, on which class insert the major towns of South America, to be completed throughout the year)

29 The problems of South America (revision)

30 A timed examination question

31 Supervision of individual topic work

Africa (continuing themes as before)

32 The mountains, plateaux and plains (outline map provided for insertion of)

33 The equatorial forest of central Africa (revision Outline map provided for vegetation map of Africa to be developed through the course)

34 Copper production in the Congo basin

35 The tsetse fly pest

36 Problems of the Congo basin

37 How cocoa is produced in West Africa (sample study)

38 How cocoa is exported (class map cocoa producing area and export routes)

39 A timed examination question

40 Supervision of individual topic work

TERM II

Africa (continued)

1 How the Sahara desert formed

2 What the Sahara desert is like (temperature and rainfall figures Insertion on vegetation map)

3 How people live in the Sahara

4 Oil production in the Sahara

5 Why the River Nile maintains its flow

6 How the River Nile is used

7 Summer crops of the Nile valley
8 Winter crops of the Nile valley
9 The Suez Canal
10 Trade through the Suez Canal
11 The problem of locusts
12 A timed examination question
13 Supervision of individual topic work
14 How the great Rift Valley formed
15 What the Rift Valley looks like (class draw section across topographical map)
16 What savanna country is like (description wet and dry season)
17 The climate of savanna lands (temperature and rainfall graph)
18 How wild life is preserved
19 How man lives in the savanna
20 How gold is mined in South Africa (map of location given)
21 Sheep rearing in South Africa (veldt vegetation added to vegetation map)
22 What is meant by mediterranean climate (temperature and rainfall graphs)
23 How mediterranean climate affects vegetation (N and S areas added to vegetation map)
24 Mediterranean fruit production in South Africa
25 Life in a native reserve
26 Problems for white people in South Africa
27 Problems for the native peoples of South Africa
28 The towns of Africa (insertion of major towns on world map)
29 A timed examination question
30 Supervision of individual topic work

Some Aspects of Australia

31 Mountains, plateaux and plains (outline map provided for insertion of)
32 The vegetation of Australia (map provided for class annotation and analysis)
33 Beef production in Australia (class map area and export routes)
34 Problems of tropical Australia
35 Water shortage in Australia
36 The Snowy River project
37 What the Snowy River project means to man
38 How wool and mutton are exported (class map area and export routes)
39 The towns of Australia (main towns added to world map)
40 A timed examination question

TERM III

Some Aspects of S E Asia (including special region)

1 Oil in the Middle East (map of oil regions given, class annotate).
2 How oil is exported (addition of pipe lines and export routes to map)
3 Mountains, plateaux and plains (outline map provided for insertion of)
4 Which are the countries of Asia? (political outline given, class use atlas to name)
5 Supervision of individual topic work
6 What is meant by monsoon climate (description wet and dry season)
7 How the monsoon affects India (temperature and rainfall of Bombay)
8 Where monsoon winds blow (map of Asia provided, class insert winds)
9 How rice is produced
10 Famine areas in the Indian sub-continent
11 Tea growing in Assam
12 The problems of village life in India (sample study)
13 Problems of India and Pakistan
14 A timed examination question
15 A rubber plantation (sample study)
16 Rubber production in Malaysia (map to show producing areas)
17 Singapore (bar graph of imports and exports class analyse)
18 Supervision of individual topic work.
19 Earthquakes in Japan
20 World earthquake and volcanic areas (simple map given to class for analysis)
21 Agriculture in northern Japan
22 Agriculture in southern Japan
23 The imports and exports of Japan
24 Industry in Japan
25 The towns of S E Asia (added to world map of towns)

Revision for end of year examination

26 Fold mountains of the world (map provided, mountains and plateaux shown Class name)
27 World map test (to be marked in class)
28 Equatorial forests of the world (insertion on new world vegetation map)
29 The savanna lands (added to world vegetation map)
30 Can you locate these climate stations? (typical examples for class analysis)

31 Life in mediterranean lands (all such areas added to world vegetation map)

32 World oil production (world map of main oil areas given, new areas named, rest revised)

33 The deserts of the world (desert vegetation added to world vegetation map)

34 Temperate grasslands of the southern hemisphere (added to vegetation map)

After examination

35 What is meant by latitude and longitude

36 How day and night occur

37 How the seasons occur

38 Supervision of topic work

YEAR FIVE The British Isles

TERM I

1 Main structural features of the British Isles

2 Main physical features and drainage (outline provided for insertion of features)

3 What is meant by temperature

4 The rain gauge precipitation symbols on synoptic chart.

5 The barometer synoptic chart symbols

6 Other features of weather synoptic chart symbols

7 Study of typical winter synoptic chart

8 Study of typical summer synoptic chart

} link with television broadcasts

9 Climate quadrants of the British Isles

10 A timed examination question

11–17 Local study and field excursions (using 6", 2½" and 1" O S maps)

18 Study of chalk clay vale 1" O S map (S E England)

19 Further map study—how chalk and clay influence the landscape

20 The structure of South east England (class draw section)

21 The influence of structure on land use

22 Fruit farming in north east Kent

23 Why the coastlands are popular resorts

24. What is meant by the London Basin

25 Why it has high density of population

26 London as a port

27 London as a market

28 London as an industrial centre

18 The industrial south east

19 Could more people live in the empty lands of Brazil?

20 Supervision of individual topic work

21 A timed examination question

22 What the Pampas are like (addition of temperate grassland to vegetation map)

23 How the climate affects life in the Pampas (temperature and rainfall graph given)

24 Cattle rearing in the Pampas

25 How meat is exported (class map cattle area with export routes).

26 Other products of the Pampas

27 The Atacama Desert (addition of desert vegetation to vegetation map)

28 The millionaire towns of South America (map of world provided, on which class insert the major towns of South America, to be completed throughout the year)

29 The problems of South America (revision).

30 A timed examination question

31 Supervision of individual topic work

Africa (continuing themes as before)

32 The mountains, plateaux and plains (outline map provided for insertion of)

33 The equatorial forest of central Africa (revision Outline map provided for vegetation map of Africa to be developed through the course)

34 Copper production in the Congo basin

35 The tsetse fly pest.

36 Problems of the Congo basin

37 How cocoa is produced in West Africa (sample study)

38 How cocoa is exported (class map cocoa producing area and export routes)

39 A timed examination question

40 Supervision of individual topic work

TERM II

Africa (continued)

1 How the Sahara desert formed

2 What the Sahara desert is like (temperature and rainfall figures Insertion on vegetation map)

3 How people live in the Sahara

4 Oil production in the Sahara

5 Why the River Nile maintains its flow

6 How the River Nile is used

7 Summer crops of the Nile valley
8 Winter crops of the Nile valley
9 The Suez Canal
10 Trade through the Suez Canal
11 The problem of locusts
12 A timed examination question
13 Supervision of individual topic work
14 How the great Rift Valley formed
15 What the Rift Valley looks like (class draw section across topographical map)
16 What savanna country is like (description wet and dry season)
17 The climate of savanna lands (temperature and rainfall graph)
18 How wild life is preserved
19 How man lives in the savanna
20 How gold is mined in South Africa (map of location given)
21 Sheep rearing in South Africa (veldt vegetation added to vegetation map)
22 What is meant by mediterranean climate (temperature and rainfall graphs)
23 How mediterranean climate affects vegetation (N and S areas added to vegetation map)
24 Mediterranean fruit production in South Africa
25 Life in a native reserve
26 Problems for white people in South Africa
27 Problems for the native peoples of South Africa
28 The towns of Africa (insertion of major towns on world map)
29 A timed examination question
30 Supervision of individual topic work

Some Aspects of Australia

31 Mountains, plateaux and plains (outline map provided for insertion of)
32 The vegetation of Australia (map provided for class annotation and analysis)
33 Beef production in Australia (class map area and export routes)
34 Problems of tropical Australia
35 Water shortage in Australia
36 The Snowy River project
37 What the Snowy River project means to man
38 How wool and mutton are exported (class map area and export routes)
39 The towns of Australia (main towns added to world map)
40 A timed examination question

TERM III

Some Aspects of S E Asia (including special region)

1 Oil in the Middle East (map of oil regions given, class annotate).
2 How oil is exported (addition of pipe lines and export routes to map)
3 Mountains, plateaux and plains (outline map provided for insertion of)
4 Which are the countries of Asia? (political outline given, class use atlas to name)
5 Supervision of individual topic work
6 What is meant by monsoon climate (description wet and dry season)
7 How the monsoon affects India (temperature and rainfall of Bombay)
8 Where monsoon winds blow (map of Asia provided, class insert winds)
9 How rice is produced
10 Famine areas in the Indian sub-continent
11 Tea growing in Assam.
12 The problems of village life in India (sample study)
13 Problems of India and Pakistan
14 A timed examination question
15 A rubber plantation (sample study)
16 Rubber production in Malaysia (map to show producing areas)
17 Singapore (bar graph of imports and exports class analyse).
18 Supervision of individual topic work
19 Earthquakes in Japan
20 World earthquake and volcanic areas (simple map given to class for analysis)
21 Agriculture in northern Japan
22 Agriculture in southern Japan
23 The imports and exports of Japan
24 Industry in Japan
25 The towns of S E Asia (added to world map of towns)

Revision for end of year examination

26 Fold mountains of the world (map provided, mountains and plateaux shown Class name)
27 World map test (to be marked in class)
28 Equatorial forests of the world (insertion on new world vegetation map)
29 The savanna lands (added to world vegetation map)
30 Can you locate these climate stations? (typical examples for class analysis)

31 Life in mediterranean lands (all such areas added to world vegetation map)

32 World oil production (world map of main oil areas given, new areas named, rest revised)

33 The deserts of the world (desert vegetation added to world vegetation map)

34 Temperate grasslands of the southern hemisphere (added to vegetation map)

After examination

35 What is meant by latitude and longitude

36 How day and night occur

37 How the seasons occur

38 Supervision of topic work

YEAR FIVE The British Isles

TERM I

1 Main structural features of the British Isles

2 Main physical features and drainage (outline provided for insertion of features)

3 What is meant by temperature

4 The rain gauge precipitation symbols on synoptic chart

5 The barometer synoptic chart symbols

6 Other features of weather synoptic chart symbols

7 Study of typical winter synoptic chart

8 Study of typical summer synoptic chart

$\left.\begin{array}{l}7\\8\end{array}\right\}$ link with television broadcasts

9 Climate quadrants of the British Isles

10 A timed examination question

11–17 Local study and field excursions (using 6", 2½" and 1" O S maps)

18 Study of chalk clay vale 1" O S map (S E England)

19 Further map study—how chalk and clay influence the landscape

20 The structure of South east England (class draw section)

21 The influence of structure on land use

22 Fruit farming in north east Kent

23 Why the coastlands are popular resorts

24 What is meant by the London Basin

25 Why it has high density of population

26 London as a port

27 London as a market

28 London as an industrial centre

TERM III

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25 The towns of S E Asia (added to world map of towns)

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35 What is meant by latitude and longitude
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23 Why the coastlands are popular resorts
24 What is meant by the London Basin
25 Why it has high density of population
26 London as a port
27 London as a market
28 London as an industrial centre

29 Regional planning for the South East
30 Wheat farming in East Anglia (sample study)
31 Wheat farming in Great Britain (outline map provided, wheat areas inserted)
32 Geographical conditions which encourage high density of fish in the sea
33 How fish are caught
34 Fishing ports of the British Isles (outline map provided, ports and routes inserted)
35 The cycle of erosion by running water (O S map study)
36 Further study of rivers (e g River Trent, River Cuckmere O S map)
37 How waterfalls occur (study of e g High Force)
38 How deltas form (page 251)
39 Revision—river study
40 A timed examination question
41 Final supervision of individual topics (by appointment)

TERM II

1 O S map study of Pennines (to show contrasts between scenery of millstone grit and carboniferous limestone)
2 Where these rocks occur in the Pennines (map given, class annotate)
3 How man uses the Pennines (based on further O S map study)

<table>
<tr><td>4 Coal on the Pennine flanks
5 The Yorkshire woollen industry
6 Iron and steel in the Don Rother valley
7 Other industries of the York, Derby, Nottinghamshire coal field</td><td>or Lancashire Coalfield</td><td>or North east Industrial area</td></tr>
</table>

8 The formation of glaciers

<table>
<tr><td>9 The work of glaciers—erosion
10 Glacial erosion in north Wales (by study of O S map)
11 The work of glaciers—deposition
12 The features of glacial landscapes (revision)</td><td>or glaciation in the Lake District</td></tr>
</table>

13 The South west Peninsula—how underlying rocks affect scenery
14 Coastal features of erosion (study of O S map and pictures)
15 Coastal features—deposition by the sea
16 The effect of climate on farming in the South west Peninsula
17 A timed examination question

18 The scenery of the Highlands of Scotland (O S map study and pictures)
19 How man uses the Highlands
20 Regional planning for the Highlands

or the Central Lowlands of Scotland

21 A port study—Liverpool, Southampton, Hull, Glasgow or Belfast

Other Studies

22 Tundra lands in Canada or Europe (tundra added to world vegetation map)
23 How man uses the tundra lands
24 Coniferous forest in Canada or Europe (added to world vegetation map)
25 Timber industries
26 Wheat farming in the Prairies or the Steppes (temperate grassland added to world vegetation map, now complete with major areas)

Revision

27 World wheat production
28 A timed examination question
29 World trade in oil
30 The geographical conditions which affect the production of rice
31 The empty lands of Brazil
32 Industrial development of Brazil
33 The trade of Brazil
34 Where people live in Japan
35 How people live in Japan—farming
36 How people live in Japan—industry
37 The problems of over population in S E Asia
38 Can you identify these climate stations? (temperate maritime, continental, equatorial)
39 Can you identify these places? (descriptive passages of monsoon forest, savanna, mediterranean)
40 World routes (world outline provided, class insert main towns and routes)

Note It is assumed that in Year Five the children have geography homework twice weekly One of these homeworks will be consolidating current work, one for revision by means of test questions and learning

School Leavers

Final Year. The British Isles Europe World Problems

Term I

1 The advantages of being islands

2 Our weather (class study weather charts, list symbols)

3 How to follow television weather reports (further study charts)

4 Map to show parts of the world with worse weather than ours (include typhoon and hurricane areas)

5 Can you find your way about London? (Class study bus and underground railway maps)

6 Why London is a port (P L A map and trade statistics)

7 Why is the S E coast a holiday centre? (board map to show where children go pictures of variety of coastal features)

8–11 Groupwork holiday centres in Great Britain Groups study Cornwall, N Wales, Pennines, Lake District, Scottish Highlands and S E England Must find (i) route there, (ii) map route, (iii) cost, (iv) scenery—mounted pictures and description, (v) what to do there, i e map local trips

12 Exhibition (class use material shown to provide answers to duplicated questions)

13 Revision why highlands are empty areas (class begin simple population map on provided outline British Isles—areas of scanty population marked)

14 Birmingham, centre of the industrial Midlands

15 Present problems of the textile industries

16 Shipbuilding—has Tyne, Clyde or Belfast most advantages?

17 South Wales does government planning help?

18 Revision where do most people live? (class add densely peopled areas to population map)

19 O S map study of an agricultural area (class shade in rest of population map as areas of medium density, i e generalised farming areas)

20–23 Group work study of dairy farming, cattle, sheep, fruit, market gardening to (i) map main areas, (ii) find out why particular type of farming is carried on, (iii) type of work involved, (iv) where products go

24. Exhibition brief group reports

25 Main road routes of Great Britain

26 Revision the iron and steel industry of Great Britain

27 Revision why London is our capital

TERM II Europe

1 What countries ought we to learn about? (Political outline map given, class name countries and insert sea routes from Britain)

2 Norway the influence of the sea (diagram of fiord settlement with saeter)

3 Holland the influence of the sea (by contrast topographical map of polders)

4 Denmark how can she export so much dairy produce?

5 The coalfields of Europe (class map on provided outline, name and annotate)

6 Industrial areas of U S S R

7 Farming in the Ukraine

8 Revision contrasts in U S S R (can be based on natural vegetation regions)

9 The satellite countries (outline map of Danube Basin provided class annotate)

10 Industry in Germany

11 The Rhine (pictures to show alpine valley, rift, gorge, plain, delta Map provided, class name and annotate)

12 Why Berlin is a problem (class draw map to show situation and routes)

13 Why Belgium is so densely peopled

14 Contrasts in France Brittany and the Riviera

15 Wine production in France (using wine lists, outline map provided, class locate and name production areas of best known varieties)

16 Why Paris is the capital city

17 Italy the Lombardy plain (using topographical map)

18 Peninsular Italy (emphasis on mediterranean coastlands)

19 Farming in Switzerland

20 The Alps

21 Revision how man adapts himself to mountain environments (world examples)

22 Revision trade between British Isles and W Europe (statistics outline map provided on which class mark main ports)

23–26 Group work holiday centres in W Europe Groups study Norway, Denmark, Holland, Italy, Switzerland, France Must (i) map route, find cost and time, (ii) describe scenery, collect and mount pictures, (iii) decide what could do when there (map of local trips to be included)

27 Exhibition brief reports

TERM III World Topics

World Food Supplies

1 Contrasts in lands producing wheat

2 Wheat lands of the world (world outline, class locate and name areas and ports)

3 World wheat trade (class make calendar to show countries and months of export)

4 The ricelands of Asia (one, two and three crop lands)

5 Why world trade in rice is limited (production statistics, population statistics of rice areas, export statistics—to be compared)

6 Meat cattle, sheep, pig areas (mapped emphasis on meat-deficient diets of East)

7 Why are tropical grasslands not major meat areas?

8 U N O and problems of the Tropics

9 How U N O helps with world food problems

World Power

10 Sources of power

11 Types and uses of coal

12 H E P—a sample study (Kitimat, Kariba, Niagara or Snowy Mountains)

13 Why is oil so important? (uses and by products)

14 The oil reserves of the world (map of ports and pipelines)

World Raw Material

15 Which are the vital minerals to today? (major supply sources)

16 The raw materials of steel production

17 Differences between artificial and natural fibres

18 World production of selected crops or products (pie graphs provided of e g rubber production, tin production class describe production in words)

19 Major world ports—what have they in common?

Water

20 Panama and Suez why are they important?

21 Inland waterways of world importance

22 Irrigation—a sample study (any area of major importance)

23 World resources of H E P (present and potential)

24 Revision the natural resources of the world, how man tries to conserve them

FINAL YEAR Alternative Syllabus for School Leavers

TERM I

1 and 2 Outdoor lesson which are our local industries? (class name on base map of locality)

3 Where local raw materials come from
4 How finished products are marketed
5 What employment opportunities are there locally?
6 Organisation of group work on British industries
7–11 Group work groups study iron and steel, car, ship, wool, cotton and light industry Must find (i) locations, (ii) power, (iii) raw material sources, (iv) products, (v) markets
12 Exhibition (class study by answering duplicated sheet of questions)
13 Where major British industries are located (class map examples of each industry)
14 The Commonwealth (class map member countries bar graph of populations)
15 What are the advantages of membership? (emphasis on trade and products)
16 U S S R and the satellite countries (agricultural aspects emphasised)
17 Where American influence is strongest (geographical facts underlying need for help of countries concerned)
18 Organisation of group work on world industrial areas
19–23 Group work groups study U S A (2), Canada, U S S R in Europe, U S S R in Asia, W Europe, Australia and S America As for British industries
24 Exhibition (class study in order to decide which are important countries)
25 Why the southern hemisphere is not yet highly industrialised
26 World communications by sea (class map main sea routes and ports)
27 Does air travel make the world smaller? (advantages and disadvantages, use of air timetables to show speed and distance)

TERM II

1 Why London is our chief port (dock study)
2 London as cultural and amusement centre (emphasis on historical growth)
3 Can you find your way round London? (using L T B and Underground maps)
4 Revision London as capital city (routes and markets mapped)
5 Travelling in the country round London (Study 1" O S map Wealden area)
6 Travelling in the country round London (Study 1" O S map Chilterns)
(5–6: or day excursion)
7 Group work organisation holiday centres in Great Britain
8–11 Group work groups study Cornwall, N Wales, Pennines,

Lake District, Scottish Highlands and S.W. England. Must find (i) route there, (ii) map route, (iii) cost, (iv) scenery—mounted pictures and description, (v) what to do there, i.e. map local trips.

12 Exhibition: class study and make own notes on different areas.

13 Revision essay: why so many people visit Britain

14 Why people emigrate to Britain (revise climate and industries)

15 Why people come from Ireland (emphasis on land use in Ireland)

16 Why people come from the West Indies.

17 Why people come from India (population statistics, sample study of Indian village)

18 Group work organisation: where the British emigrate to.

19–22 Group work: groups study Australia, Canada, New Zealand. Must find (i) distance away, (ii) cost (including government assisted passages), (iii) climate, (iv) types of work available in given areas

23 Exhibition (class study to answer duplicated sheet questions as to relative costs, different types of work available,

24 Essay: if I had to emigrate, where I would go

25 Revision: the advantages of living in Britain (varied climate, scenery, agricultural and industrial opportunities)

TERM III

1 Revision: opportunities offered by our borough for work

2 Recreational opportunities in our borough

3 Opportunities for children leaving school in different areas, e.g. (i) in the Lake District.

4 (ii) in an East Anglian village (sample study)

5 (iii) in a big industrial town (using O.S. map)

6 Different opportunities offered at different times, e.g. (i) in Britain of Industrial Revolution (contrasts in agriculture and industry of those times)

7 (ii) In the depression of the inter war years (S. Wales and ship-building areas)

8 (iii) In Britain now (trading estates, highland development schemes, N.F. area scheme and agricultural subsidies)

9 Group work organisation: responsibility for other people

10–13 Group work: groups study Ghana, Cyprus, Malta, Pakistan, Egypt, Vietnam to find (i) climate, (ii) natural resources, (iii) modern problems, (iv) possible schemes for development

14 Exhibition (class study geographical background of these areas by means of duplicated question sheet)

15 Essay: how Britain can help underdeveloped countries

16 International co-operation (i) in meteorology

17 Forecasting our weather (study of synoptic charts)

18 (ii) In fighting diseases (the geography of malaria)
19 (iii) In soil erosion and conservation
20 (iv) In reafforestation
21 (v) In the agricultural services of U N O
22 (vi) In expeditions (e g Antarctica)
23 (vii) In cartography (e g study of 1 million maps)
24 (viii) In geography—the I G U
25 Revision essay 'International Co-operation'

CHAPTER 15

THE SIXTH FORM

SIXTH formers have during the last decade become suddenly and strikingly more numerous It seems hardly necessary to document this change, but figures summarise it The first sixth form statistics were published by the Ministry of Education in *Education in* 1958 (H M S O), those of 1963 come from the Department of Education and Science, *Statistics of Education, Part I* (H M S O) They are the total figures (1st, 2nd and 3rd year) of sixth form pupils in all maintained secondary schools in England and Wales

Year	Boys	Girls	Total
1958	43,252	33,027	76,279
1963	84,164	62,590	146,754

In practice, it means that most specialist teachers in grammar and other schools of similar age range will have some work with the sixth, and the classes of six to twelve which formerly permitted informal tuition and discussion are now swollen to fifteen and twenty or more A large proportion of the sixth will enter university or some form of higher education Many colleges of education are able to select entrants with two A levels There is greater pressure on pupils to enter the sixth form One of the various suggested rearrangements of secondary education is to have sixth form colleges The Leicestershire plan regroups children in schools at age thirteen or fourteen years All these are pointers to the need for specialist teachers for the upper age range, particularly for the conventional two year course leading to A level

The Crowther Report[1] offers a full picture of sixth forms in

English schools, and its statement[2] of the distinguishing marks of the sixth form should be known to all concerned First is a close link with the university, this link forming its essential characteristic Second is the provision made for study in depth, for intellectual discipline Third is the independent work done by the pupils, implying considerable responsibility for the organisation of their own time Fourth is the intimate relation between pupil and teacher, the possibility of sharing an intellectual life Fifth is social responsibility, not a characteristic of the sixth former's academic work, but of the part he or she plays in the life of the school Thus a close link with the university, specialisation, independent work, intellectual discipleship and social responsibility are the marks which distinguish the sixth form

Although Crowther is masterly in its summary of the general requirements of sixth form teaching, geography as a subject gets but little mention In the discussion of the sixth form curriculum,[3] leading to the pronouncements on literacy, numeracy and minority time, geography is somewhat naively allocated to the arts side This may be the fault of geographers for not defining their position In at least one university geography may be taken in an Arts or a Science degree Research articles, for example in the Transactions of the Institute of British Geographers,[4] show a strong scientific trend The title of Wooldridge's collected works, *The Geographer as Scientist,* underlines this Other geographers emphasise the need for a literary approach and bemoan the fact that no great writing has recently appeared There is a case, not mentioned in the Report, for geography as a bridge subject Its scientific side offers an introduction to the scientific approach to the Arts sixth former, and its presentation in cogent literary form reminds the scientist of the need for literacy

We offer as introduction two propositions which we hold to be true First, we maintain that good sixth form teaching leads to good A level results There is nothing in what is advocated which is inconsistent with the A level examination requirements Second, good sixth form work in the subject is equally appropriate for further advanced study in geography, university or other advanced study in other fields, and earning a living i e leaving school aged eighteen years We imply that geographical study in the sixth is a good educational process for both the future specialist and non specialist, if it is approached in an attitude of disciplined enquiry and discussion, rather than one of unthoughtful absorption of new factual knowledge

At this point, we must consider certain general principles of sixth form education, bearing in mind that we are concerned with the teaching of geography These are, in effect, the second, third and fourth points of Crowther, but we express them somewhat differently

This is a period when provision is made for an increased amount of independent work' Let us rather say it is a period of learning to use independence In addition to the wider educational implications, in the narrow terms of subject and classroom work, it means two things First, pupils must learn—and this means be helped and shown how—to make their own plans for study They must learn to work not entirely guided by the teacher Secondly they must become able to drive themselves to cover the necessary ground, and to maintain their efforts over prolonged periods The difference in practice is perhaps that in the fifth form work is allocated each week, in the lower sixth work is allocated for a fortnight This period will be gradually extended to a month For the last term or so, the pupils must plan their own campaign, so far as effort is concerned The teacher should have become the guide but not the goad

This process must be gradual It will be spread over the two-year course Sixth formers very easily put off giving in essays, and there is a subtle balance which the teacher must judge between allowing pupils full responsibility, which may mean their failing to do the work, and narrow driving which causes disaster when the pupil is suddenly placed in the freedom of a university It is a courageous teacher who says to his upper sixth, 'Your responsibility for doing your work is now your own' It is a clever one who can say this yet cautiously and inconspicuously retain a watchful eye on progress

The seeds of the ability to work independently should have been sown in the fifth year, and the following quotation is relevant 'The sixth form, certainly in their first year, need teaching in much the same way as the fifth form, from whom they differ little in age or outlook The syllabus should be designed, therefore, to include a variety of lessons of increasing difficulty The assumption that a series of lectures is adequate sixth form instruction has no scientific foundation The syllabus should permit a gradual increase in individual work, in reading, the selection of material, mapping skills, choice of essay topics, and of topics for class discussion, and include opportunity for the pupils to allocate their own time for work which should always be in hand'[5]

Sixth form time is also a period of enjoying and seeing the value and purpose of a particular subject This has been traditionally the great strength of British sixth form education It has been under fire for being narrow, and this has led to the Crowther Report's reference to 'minority time' But it is not attacked in principle 'We endorse the principle of specialisation, or study in depth '[6]

There are obvious implications of this fact for the teacher He will have made the subject as attractive as possible at all previous stages Provided the content was interesting and the immediate purpose clear, younger children tend not to query the nature of the subject or its ultimate purpose In the sixth pupils will require subject matter which is intellectually satisfying They should be shown something of the method and purpose of geographical study, and needless to say, the teacher must present his matter in a manner which is consistent with geographical method It is particularly important in the sixth form that geography should not be merely the acquisition of facts and other people's judgements

The most elementary application of this principle is that more than one source should be studied Many wish pupils to have one main text book This idea is probably sound The pupils are at first too immature to be left to find their way among a variety of texts One can be conveniently considered as a main reference book, but as soon as possible they must look at others, and it is in the sixth that they really learn for the first time that the truth does not lie between any one pair of covers

We have already suggested that the sixth form should become aware of geographical method The university entrant who is asked 'What is geography?' should be able to make some attempt at reply, without necessarily rivalling—or indeed having heard of —Hartshorne He must learn something of geography s particular discipline and mode of thought The essential pre requisites of this, at sixth form level, are a clear English style, a vocabulary which permits good description, an understanding of logic, that is a knowledge of what may legitimately be inferred or deduced when using geographical facts, an understanding of the function of maps

The Committee[7] appointed by the Geographical Association underlines this point 'For most of the pupils, the sixth form would be their last acquaintance with geography as an academic discipline so that the teacher's task lay in combining the use of geography as an instrument of general education for all their

pupils with the needs of those who would pursue their specialist studies further' Our interpretation of the use of geography at this level as an instrument of general education is particularly that during its study pupils should learn to state a case clearly and know what conclusions can be validly drawn from the facts

Sixth form years are the period of the greatest impact of the teacher A university entrant was once asked what was the main effect upon him of the sixth form The reply was 'I know the stock answer is that you learn to work by yourself, but to me the main impact was the influence of a good teacher' This is the 'intellectual discipleship element mentioned by Crowther, and although it is in no way peculiar to the teaching of geography, the young teacher must be aware of its importance The years sixteen to eighteen are very impressionable ones, and in the smaller classes the teacher emerges much more as a person In these classes there is a much higher percentage of volunteers, pupils who have opted to do geography They are already more than favourably inclined towards the teacher, and the whole quality of his personal influence upon them is important The influence of one or more of his sixth form teachers is probably the greatest single factor moulding the lives of many eighteen-year-old school leavers The teacher's own intellectual clarity and integrity is of first importance He is expected to know his own subject, and there must be no attempt to slur over unknown points What is not known must be looked up His own personal standards will also be under close inspection, particularly when problems with a moral element, such as of race, immigration or independence occur He must state his own views as fairly as he can, while admitting that the matters are fiercely debated He should at all times bear in mind Emerson's words 'What you are stands over you the while, and thunders so that I cannot hear what you say to the contrary'

Lest this be thought to be an impractical and idealistic outlook, let us consider the examiners' opinions The following phrases are culled from examiners' reports* in geography at Advanced level Relatively few candidates seem willing or able to think hard about the meaning and implications of the questions, and lack the discipline to answer them cogently The general impression is that many candidates have a stock of prepared answers upon which they draw rather indiscriminately' 'The most persistent weakness was the failure to read the questions carefully and to consider exactly what was required Only the more able

selected their material purposefully and evaluated its relevance and importance before putting pen to paper' 'In the construction of sentences far too many placed too great a reliance on loose co-ordination, frequently by means of such words as however, yet, therefore and so The candidates of some centres showed no evidence that they were in the habit of discussion Some centres hardly produced a diagram or sketch map per paper, and others had never been taught to handle textbook material beyond reproducing it' 'The outstanding impression is of the numbers of candidates who misunderstood the wording of the questions This must be due to some extent to a flustered, cursory reading of the question paper, but it must also indicate a lack of reasoning power Candidates who are disappointed with their grade should ask themselves whether they took care and paid attention to the specific terms of the questions chosen Failure to answer the actual—as opposed to the desired—question on a topic or region always results in loss of marks The examiners paid great attention to the wording of questions but too many candidates insisted on writing all they knew in the belief or hope that the examiners would pick out what was relevant Those who ignore operative words like "assess", "relationships", are penalised' Some relevant phrases from the questions concerned are 'examine the relationships between', 'assess the role of' and 'describe the distinctive regional characteristics of'

These comments are upon the end products of the sixth form, and it has already been mentioned that progress towards the end must be gradual There are a number of matters which require careful judgement The first is the striking of a balance between spoon feeding the pupil and offering him large doses of indigestible matter A common opening of the course is the distribution of three or four major texts Their very existence at first excites the growing mind, second impressions are sometimes that sheer quantity is overwhelming The geography teacher in the sixth must offer at first careful guidance in their study Different books on the same region or topic may be given to individuals Each pupil reports to the class on the scheme or layout of his particular book, the class then discusses the various approaches When they are familiar with the contents of the books they can discuss which approach they found most satisfactory, and why For a given topic individual pupils may first each read a chapter from a different book Their written resumes may be read to the class, which then analyses the factual content and the different

approaches made to the topic Such precis of chapters is useful guidance for note making From this type of work there must be a transition towards independence, so that in the last terms pupils have learnt to select their own reading and to analyse the meaning of problems for themselves

The warning of the examiners against cramming is clear enough, and the second matter needing consideration for the advanced geography pupil is to find the proper balance between coverage of sufficient factual material and the digestion of it by contemplation and discussion There is no short answer to this The content of geography at this stage is quite large It is significant, however, that the comments of examiners and university selectors refer seldom to lack of geographical factual knowledge, and frequently to incomplete assimilation or understanding of it

This leads us to the third problem of sixth form study, that of the selection of the right texts and other reading The Overlap Committee[8] gave considerable thought to this matter, and the following comment by a university tutor is quoted 'Frequently the schoolboy says that he has read books which I would not recommend to an undergraduate until at least his second year Frequently a leading question soon shows that the material is ill-digested even if it has been understood if teachers would concentrate on providing their candidates with a factual knowledge to Advanced and Scholarship levels and on training them in the use of it, rather than asking them to read part of the University course in advance, their candidates would give a much better performance' Again 'many university teachers agreed that overlap existed but gave different explanations from those of the school teachers They complained of the reading of advanced texts which were not properly understood, of teachers who discussed controversial theories with immature children but neglected to teach the basic geographical distributions . . the lack of sound and fluent English and above all the absence of an intellectual curiosity in the subject'

These comments support what we have written earlier, but they were made in 1960 Time may have partly remedied the situation At that time some of the over advanced reading may have been provoked by the existence of the S level examination Too many schools may have been striving after S level results with candidates not really up to the work While there is a shortage of university places, however, entry to which is considerably influenced by A level grades, there will continue to be

an understandable tendency to offer reading beyond the candidates' capacity

Time has also greatly improved the text book supply We are only now emerging from the shadow of wartime shortages Publishers at first embarked upon programmes of more general text books for lower levels Sixth forms expanded rather earlier than the book supply and this may explain the remarkable range of level of text book which the Overlap Committee mentions Many major firms are now offering a series of text books specially written for A level work Those who describe their offers as 'suitable for the sixth form and first year of degree work' might find themselves hard pressed to justify their claim if involved in a triangular discussion with representatives of school and university Of course we would not deny that at school pupils should become acquainted with wider and more advanced reading Some such works should be in all school libraries, but the pupils' first reading in them should be carefully guided and of selected passages, not mere assimilation as a text book study

The amount of theory which should be included in A level work has been touched on and this difficult problem has given rise to some controversy between dons and schoolmasters It is not impossible to find those on one side who say, 'Please give less consideration to (for example) geomorphological theories and those on the other who reply, 'But you have included them in your A level questions' Careful examination of A level questions shows that in the great majority of cases they can be answered without, and indeed do not require, a knowledge of currently debated theories In the field of physical geography, a knowledge of landforms is certainly required, together with some knowledge of the processes which create them, but usually the questions are so framed that a full answer can be given without reference to origins and theories still under investigation Consideration of field evidence and resulting theory is very properly a university study When pressed in the classroom, the teacher can reasonably reply, 'These matters are still under investigation and form part of university work'

These are general considerations The teacher is also faced with the specific problem of the content and lay out of a two year course This will be defined by the Examinations Board for which he is presenting his candidates, and a common pattern

can be discerned This pattern is of a mapwork paper, a regional paper commonly requiring study of two selected major areas, and a general paper, mainly on the physical basis of geography, but sometimes including studies on a world basis. Field work is expected to be in evidence where relevant. This division, which is presumably necessary for the purpose of definition of syllabus and organisation of examination, perhaps militates against the unity of the subject The opinion of the Overlap Committee[10] is clearly stated. 'It was thought that regional geography should continue to be the basis of work in school. Map reading and interpretation should of course play a prominent part and be related wherever possible to regional studies. Similarly it was appropriate to introduce some systematic study, notably geomorphology and human geography, into sixth forms, but again rather as an aid to the understanding of regional geography than as detailed studies in their own right'.

In practice this is not easy, and many teachers, in effect, have two streams of work, one regional and one systematic Where two or more are sharing the work, this is an obvious basis of division It is a good educational point that pupils should bear the ideas of more than one teacher, but close staff-room liaison becomes vital For one teacher to undertake the practical paper, divorced from the remainder, is unfortunate. Practical exercises in map work should be closely related to both the regional and the physical studies, and form an integral part of them, and there is little organisational problem here. Some would argue that after the mainly regional work which culminates in O level, pupils are interested by the fundamentally different approach of systematic study, and would thus make this the main content of the first year There is no complete solution The content of geography by now has become so large that some form of division must be made, if only for organisational purposes. The important principle which the teacher must bear vividly in mind is that as much cross-reference as possible must be made Specific examples from areas must illustrate physical studies World generalisations must be seen to be formed from regional knowledge

It seems appropriate here to review the methods available. Normal oral work in the classroom, i e. the teacher teaching, is not to be neglected or despised, particularly in the first year Most of the teaching ideas already suggested remain valid. Pictures, maps and other data are as important in the sixth form classroom lessons as lower in the school The work will, of course,

be graded differently. The occasional sample study will form but a short introductory section of a lesson. A selection of different pictures of a large region can be studied by individuals and the resulting descriptions collated. Field sketches can be extended from pictures to those drawn from written descriptions and Ordance Survey maps. The careful study of such maps typical of regions is essential, one aim being to find out why they are typical. Careful analysis of a foreign topographical map should enable a class to locate it with fair precision. The teacher can select a published map illustrating a given point and by class discussion discover how it fulfils its function. The class should be given work to do. The first year sixth are usually only too willing to listen, in the belief that they are covering a great deal of ground. There is a great temptation for the teacber to think that if they are told, they know. Within strict limits, this is sound enough. Sixth-formers are at a stage when they are happy to absorb facts; provision must, however, be made for their subsequent consideration.

We have mentioned the need for guided study of the text book (page 92). Specific classroom time should be allocated for a review of the content of the work, and indication or classification of important sections. It is here that careful introduction to more advanced works can be made. The occasional reference to a single paragraph or map in a more detailed text will introduce ideas beyond the standard book without overwhelming the pupil with a mass of material which he cannot comprehend. The pupil's own reading is probably the most important part of his sixth form work. He must be weaned gradually from reliance on one book, though sound knowledge of such a single book may be expected. Very gradual and limited reference to other reading in the first year will develop to specific study of chapters in other books during later essay work. It is clearly vital preparation for *university work—or indeed any independent adult study*—that they should learn how to find other material which is relevant, but this is a matter for the later stages of the two-year course.

Much that has been said in this chapter is elaborated in *Geography and Education*,[11] but perhaps the main theme of its pages is the importance of learning to handle facts by discussion and by writing. The sixth form should be encouraged to contribute to discussion. Such discussion is likely to be successful only if the class has had an opportunity to study the necessary topic

beforehand Variety can be ensured by encouraging individuals to give ten minute talks on different aspects of a topic, the class then commenting Individuals can take different sides on certain issues and debate them It is not impossible to permit a likely candidate for the teaching profession to take the class for a lesson or a part of it Sixth formers are often silent not because they have nothing to say, but because they feel their views are inaccurate and will invite the scorn of their fellows They need encouraging, a flat statement of disapproval may well undermine their confidence This important discussion and tutorial work is made more difficult by the large sets of fifteen and twenty pupils not uncommon today The present size of sixth form classes puts some pressure on teachers to revert to the mass instruction methods used lower down the school

A carefully graded programme of written work must be arranged The amount of written notes made from oral work or text book is perhaps a matter for individual taste Certainly some written record is needed, if only for revision purposes, but the tendency for this to become voluminous must be watched Lecturing to the sixth form encourages them to take down all that is said, this does not necessarily imply good note taking Analysis of a paragraph, page or chapter for reduction to note form is good practice, so is precis of newspaper or magazine articles and descriptive passages A regular programme of essay writing is essential, and its marking is one of the heaviest burdens on the teacher Guidance in the writing of essays is vital In the first year sixth the class can first analyse the question set, and work out a scheme for the answer together Individuals can prepare schemes for a given topic The class then discuss the merits of the schemes and select or reorganise to find the most appropriate Provided with duplicated sets of facts about a region or topic, the class then has to organise and present these facts in different ways to answer different questions, only the facts provided being used Timed essays should be written in class on topics studied previously The type of essay set should be varied, an occasional essay requiring imagination is useful, e g 'What would happen if the seas round Britain sank six hundred feet?' or 'The ideal frontier' If numbers permit the return of essays by individual tutorial methods, so much the better

These methods are, in the main, internal to the classroom The wider aspects of sixth form work, of visiting speakers, visits to exhibitions, and the activity of the school Geography Society,

all of course play their part Field work, which is now a part of A level requirements, is considered in chapter 8

Where six periods a week are allotted to the subject (and this is a common minimum) the following pattern is suggested two periods of oral teaching, one period of guidance on private study, one period on a discussion topic, and two periods of private study During this latter time essays can be returned In the earlier stages the oral work may well bulk larger, in the latter, the private study time may be increased In practice the study time available, including homework and additional private study periods, varies enormously, particularly now only two A level subjects are sometimes taken The principle is clear Mere lecturing 'to cover the syllabus' must be kept carefully in proportion, and guided work, including reading, essay-writing, map study and other exercises must have its full share of time available

Such an allotment of time is for pupils taking geography to A level A possibility for the future is the establishment also of minor subjects in the sixth form, receiving perhaps only half this time allotment The same principles will apply Pupils should make some form of study in depth, in order to learn the geographer's outlook and method, rather than make a skimpy factual cover of the world It follows that the content of geography as a minor subject should be severely selective A few particular areas or problems should be studied in detail One systematic branch of geography might be selected instead, but such a choice has the weakness of not showing every aspect of geographical content Ideally the content of the minor course should be adjusted according to the major courses taken The historians or linguists could take geography with a scientific bias, and the scientists its more humanist or literary aspects These are matters for the future which are in the process of development

NOTES

1 Report of the Central Advisory Council for Education—England '15 to 18' (The Crowther Report) H M S O 1959

2 *ibid*, pp 223 225

3 *ibid*, p 266

4 Steel R W A review of I B G publications, 1946–60' *I B G Transactions*, 1961, pp 129–147

5 *Handbook for Geography Teachers*, pp 43 44

6 The Crowther Report paragraph 419 p 281

7 Report on the discussions of the Committee appointed in 1960 to investigate the alleged overlap of the work in Sixth form and First year

University Courses in Geography. Geographical Association. Supplementary Papers No 1, pp. 4–5

8 University of London School Examinations Council. Subject Reports, 1961, 1962, 1963

9 Overlap Committee, *op. cit*, pp. 7–8.

10. Overlap Committee, *op cit*, p. 5.

11. *Geography and Education*. Ministry of Education Pamphlet No. 39, 1960, Chapter 8, pp. 42–48.

A SIXTH-FORM SYLLABUS*

This syllabus is organised on the parallel method, the regional work is taken by some staff, the systematic by others Close staff-room liaison is maintained The large-scale map interpretation is linked with the physical studies, and the economic mapping is done at appropriate points during the regional studies One item of field work per term is aimed at Some of the detailed items listed are given to boys as units for individual study The whole programme is not necessarily always covered in full, but the majority of it is normally completed

Factors in the Compilation of the Syllabus

1 Geographical features, comprising landforms, weather and climate, vegetation and soils, the distribution and exploitation of the world's material wealth, man's pattern of towns and villages on the earth's surface, and his communication systems, are complex in their interdependence and require careful synthesis Numerous opportunities must exist for students to learn full appreciation of this fact, and to undertake work in harmony with it

2 Requirements of three classes of students must be met

(a) The sixth form leaver, for whom A level work in three subjects represents the rounding off of a sound general education, and the end of full-time study

(b) The potential college of education or university student proposing to read a subject allied to geography after A level In such cases an insight into the scholarly approaches of the neighbouring discipline of geography is of much value

(c) The intending college of education or university student of geography, who must be guided to recognition of the essential place of field study in advanced geography, and provided with opportunities for wide and detailed reading and the display of geographical scholarship

3 Time The study of three A level subjects for eight periods each per week implies a total study time for one subject equal to a concentrated learning period of, say, six months duration This is sufficiently short a time to mean that careful syllabus planning is essential

* Kindly contributed by D G Ferguson, B Sc., Senior Geography Master, Leyton County High School for Boys

Much useful student work can take the form of reading and note-making in private study time prior to discussion of a subject in class, and for this reason also it is desirable that the syllabus should point clearly a way ahead

4 (a) Scope for original work should be apparent, e g in interpretation of maps and statistics, and in solving A level geography problems

(b) Review of geographical material in the light of different problems is further important in the learning process

(c) Freedom to integrate aspects of geography listed under different headings, e g in the Landforms and British Isles categories, should be apparent from the framing of the syllabus

Field Study

1 Hampstead Heath and Mimmshall Brook areas
2 Chilterns country from Tring Gap to Ivinghoe Beacon
3 Box Hill and Leith Hill
4 N Downs and Peasemarsh Anticline E of Guildford
5 Aylesford, Blue Bell Hill, Holmesdale, Maidstone
6 High Weald—Lingfield, Dry Hill, E Grinstead
7 Dale Fort Field Study Week
8 N Wales or Lake District or W Grampians walking tour
9 Switzerland holiday visit
10 Relief and drainage of a small field area
11 Relation between underlying rocks and soil types
12 Extent to which agriculture related to physical background
13 Discuss settlement pattern in a small field area
14 Examine communications network of a small region
15 Relationship between physical basis and human occupance

Usually four of 1–6, one of 7–9, and four of 10–15

Landforms

MAPS, ROCKS, STRUCTURES, VOLCANOES, LIMESTONES

1 Scale and representation of relief on maps
2 Slope—in field and on maps
3 Characteristics and uses of granite, sandstone and slate
4 Origins and nature of fold and fault movements
5 Light thrown upon nature of earth's crust by seismograph records
6 Influence of faulting directly and indirectly on landforms
7 1/100,000 Vesuvius—studies of landforms
8 Distribution of volcanism and associated surface features

9 Extrusive and intrusive volcanic landforms
10 1″ Wensleydale—carboniferous limestone scenery
11 1/50,000 French Jura—landscape evolution
12 1″ S W London—relief forms sketches and development
13 Landforms associated with limestones
14 Cf limestone landscapes with those on other rocks
15 Work of underground water in temperate areas

RIVERS

16 1″ Barnstaple—Heddon, W and E Lyn young valleys
17 1″ Preston—interlocking spurs and Ribble meanders
18 Stages in denudation of plateau by river action
19 1/62,500 Mississippi—flood plain landforms
20 1/200,000 Rhone delta—physical features of Camargue
21 Common landforms in lower valleys of large rivers
22 Normal cycle of erosion
23 1″ Swansea—Tawe and Neath river capture
24 Evolution of landforms and drainage in Weald
25 Nature and origins of landforms in a mature valley, subsequently rejuvenated
26 ½″ Cumbria—radial drainage
27 Nature and origin of superimposed and antecedent drainage
28 Forms and origins of dendritic, radial and trellis drainage
29 Preparation of contour maps, e g alluvial fan and rejuvenated valley
30 Factors in regimes of rivers, and classification of régimes

GLACIERS, DESERTS

31 2½″ Helvellyn—Helvellyn mass and Thirlmere valley
32 Landforms of ice erosion in a mountains area
33 Preparation of contour maps, e g cirque and glaciated valley
34 Ice erosion—shield regions, cf young fold mountains
35 1″ Kirkcudbright—glacial deposition and indeterminate drainage
36 Landforms of glacial deposition in a lowland region
37 Preparation of contour maps, e g drumlins and end moraine
38 Shapes and origins of landforms at ice margin
39 Landforms from two regions showing ice (a) erosion, (b) deposition
40 Thames and Severn—glacial influence on courses
41 Drainage modified by glaciation
42 Distribution, origin and character of loess
43 1/62,500 Arizona—'wind and water' phenomena
44 Variations in desert landforms
45 Importance of wind as agent of erosion and deposition, of running water

COASTLINES, LAKES

46 1" Barnstaple—marine erosion and deposition

47 Destructive and constructive processes along coasts, and land-forms

48 1" Plymouth—erosion, deposition and rias

49 Physical and human geography of Solva Ria

50 1" Loch Linnhe—fiord and raised beach

51 Preparation of contour maps—ria, fiord, Dalmatian coasts

52 1" Ipswich—submerged lowland coast with deposition

53 Main characteristics of submergent and emergent coasts

54 Distribution and origin of coral reefs and atolls

55 Evidence land has (a) fallen (b) risen relative to sea level

56 Detailed study of short stretch of coastline

57 Variations in coast configuration and their origins

58 ½" Cumbria—evolution of lakes

59 Formation of four lake basins of diverse type

60 Explanatory classification of lakes

GENERAL

61 1" Lincoln—lowlands of denudation and deposition

62 1" Swindon—physical and human geography studies

63 Stages in development of two particular types of mountains

64 Classification of mountains based on origin

65 Cf shapes and origins of two actual valleys

66 Classification of plains based on origin

67 Factors determining resistance to denudation of rocks in temperate humid climates

68 Parts of wind, water and ice in formation of superficial deposits

69 Differing cross profiles of valleys

70 Differing long profiles of valleys

71 Cf ways in which rivers and glaciers carve valleys

72 Origins of waterfalls

73 Physical geography of water supply

74 Relief features of Pacific and Atlantic Ocean floors

75 Nature and causes of movement of ocean waters of Pacific or Atlantic

Weather and Climate, Vegetation and Soil

WEATHER

1 Weather observations and instruments

2 Lea Valley—temperature inversion with terrain effects

3 Nature and causes of air temperature variations in local area

4 Nature and causes of rainfall variations in local area

5 London Basin—derivation of mean annual rain statistics, isohyets, explanation

6 Stability and instability in the atmosphere

7 Air masses affecting British Isles

8 Weather map preparation and interpretation—depression and anticyclone

9 Warm, cold and occluded front weather, anticyclonic weather

10 Ridges and troughs

11 Land and sea breezes, mountain and valley winds

12 Fohn, mistral, sirocco, harmattan, tornado, hurricane

13 Dew point, orographic rainfall, thunderstorms

14 Nature and origins of principal types of rainfall

15 Origins of fog, its geographical importance and dispersal

16 General atomospheric circulation

17 Distinctions between doldrums and horse latitudes, westerlies and trades

18 Main climatic consequences of irregular land and sea distribution

19 Causes and consequences of pressure variations over one continent

20 Examination of principal types of annual precipitation regimes

CLIMATE

21 Austin Miller 'A' climates

22 W Africa rainfall—isohyets, analysis, limitations

23 Tropical monsoon graphs—preparation and explanatory description

24 Austin Miller 'B' and 'C' climates

25 Mediterranean graph—preparation, description, analysis

26 Features of cool temperate continental climate

27 Austin Miller 'D' and 'E' climates

28 Continental graphs—preparation and explanatory description

29 Variations within Arctic climates

30 Austin Miller 'F' and 'G' climates

31 Nature and origins of desert climates of all types

32 Influence of altitude upon climate

33 Cf nature and causes of seasonal wind variations in a mediterranean and a monsoon area

34 Differences between climates of W and E margins of N America

35 Extent to which interior climates have common characteristics

36 Reasoned description of areas with less than 80" annual precipitation

37 World ocean currents and influences of a warm and a cool current

38 Currents of N Atlantic and relation to climates of adjacent lands

39 Problem graphs—description and analysis
40 Relevant climatic data to consideration of crop limits

VEGETATION

41 Factors influencing distribution of natural vegetation
42 Vegetation communities and successions
43 Relation between climate and vegetation in tropics
44 Climate and vegetation of E sub tropical or W temperate margins in N or S hemisphere
45 Cf characters and climates of savanna and prairie (steppe) grasslands
46 Selva, savanna, maquis, prairie, taiga
47 Cf characters and distributions of tropical rain and coniferous forests
48 Europe forests—pie and bar graphs, description and explanatory notes
49 Scrub and desert vegetation
50 Vertical zonation of climate and vegetation

SOIL

51 Relation between soil and rock type in a field area
52 Soil acidity and texture
53 Relation between soil, climate and vegetation in actual soil regions
54 Humus, air and water in soil
55 Different bases for soil classification and their geographical importance
56 Major soil types and distribution
57 Soils of Britain
58 Laterite, brown forest soil, chernozem, podsol, rendzina
59 Soils in tropical lands
60 Types of soil erosion and methods of conservation

Human Geography

1 1" N E London—physical and human geographical relationships
2 1" S W London—woodland and parishes, N Weald
3 1/25 000 land use maps
4 ¼" Cumbria—occupations and settlements
5 1" Nevin—land use and settlement studies
6 1" Wensleydale—human geography of Gretadale
7 1/200,000 Rhone delta—cf Languedoc and Provence
8. 1" Lincoln and Plymouth—hill settlements
9 1" Swansea—mining, metallurgy and communications

10 1" Bishop Auckland—human divisions and rail system
11 1" Preston and 1/25,000 Exeter—town contrasts
12 1" Loch Linnhe—settlement functions
13 1" Barnstaple—human geography of coastal area
14 1" Preston and Ipswich—resorts and packet ports
15 1" Swansea and Plymouth—cargo and naval ports

Economic Mapping

1 Chilterns parish land use—dot maps and comment
2 North Yorks moors population—dot map
3 Swanage population—dot and proportional circles map
4 Tasmania population—dot map
5 Middlesex population densities—shading method
6 Surrey population densities—shading and limitations
7 S Africa population densities—shading and comment
8 Great Britain land use—pie graphs and alternative method
9 Israel land use—pie graphs and bar charts
10 Monsoon Asia rice—pie graphs and comment
11 Suez Canal trade—pie graphs
12 W Africa exports—bar charts and comment
13 London rail services—flow line diagram
14 Exeter bus services—flow line diagram
15 Great Britain exports—flow line diagram and comment

N W Europe

BRITISH ISLES

1 Distinctive agricultural features of E Anglia and Fens
2 Factors in industrial geography of Greater London
3 Features distinguishing S W Peninsula from rest of England
4 Economic development of Wales
5 Factors in population distribution of Eire
6 Regional division of Scotland
7 Relation between power and industry and Northumberland and Durham
8 Physical and human factors in textile industries of Lancashire and Yorkshire
9 Nature and origin of trade of Mersey and Humber ports
10 Industrial geography of Black Country
11 Physical and human factors in English agriculture
12 Iron and steel (and engineering) industry of United Kingdom
13 Economic importance of Highland Britain
14 Cf geography of Scotland and Wales
15 Classification of coastal towns in Great Britain

FRANCE

16 Major regional differentiation in France
17 Agricultural patterns in Paris basin
18 Factors in industry in Paris basin
19 Paris—setting and functions
20 Relationships between physical and human geography in Brittany
21 Cf Aquitaine and Rhone basins
22 Leading towns in S France
23 Landscape variation—Central Massif
24 Alpine areas of France
25 Relationships between climate and agriculture in France
26 Power resources in France
27 French iron and steel industry
28 Reasons for distribution of manufacturing in France.
29 Importance of inland waterways
30 Rail, road and air networks in France

BENELUX AND SWITZERLAND

31 Regional division of Benelux
32 Physical and human factors in agriculture of Netherlands
33 Factors in natural vegetation and crop distribution in Belgium
34 Iron and steel industry of Benelux countries
35 Manufacturing industries in Benelux countries
36 Amsterdam and Rotterdam—positions and functions
37 Classification of Belgian towns
38 Economic divisions of Netherlands
39 Variety in Belgian regional development.
40 Water in the lives of the Benelux countries
41 Switzerland—Jura, plateau and Alps
42 Relative importance of agriculture and industry in Switzerland
43 Imports as complement to resources in Switzerland
44 Geographical basis of Swiss tourist industry.
45 Population distribution of Switzerland

GERMANY

46 Regional characteristics of N German plain.
47 Physical and economic character of German coastlands
48 Geographical positions and importance of Hamburg and Berlin
49 Dominance of Ruhr in pig iron and crude steel production of W Germany
50 Industrial geography of middle Elbe
51 Land use in Rhine gorge and rift valley
52 Upland Germany N of Main
53 Upland Germany S of Main

54 Studies of Frankfurt and Munich
55 Economic importance of highland Germany
56 Regional division of Rhine basin
57 Cf geography of N and S Germany, E of Rhine
58 Imports as complement to resources in W Germany
59 Town distribution in W Germany
60 River and canal communication in Germany

SCANDINAVIA

61 Regional characteristics of Denmark
62 Physical and human factors in Danish agriculture
63 Copenhagen—setting and functions
64 Regional division of Norway and Sweden
65 Geographical basis of Norwegian fishing industry
66 Factors in natural vegetation and crop distribution in Norway
67 Population distribution in Norway
68 Physical and human factors in Swedish agriculture
69 Factors in iron and steel industry of Sweden
70 Industrial geography of Sweden
71 Cf. W Norway with E Sweden
72 Cf Oslo and Stockholm
73 Relationship between climate and agriculture in Scandinavia
74 Relative importance of power sources in Scandinavia
75 Contrasts—Norway, Sweden, Denmark

GENERAL

76 Cf S W England with N W France
77 Cf industrial geography of S Wales with N E France
78 Cf geography of Scottish highlands with highlands of Norway and Sweden
79 Cf human geography of N E England with Ruhr area
80 Cf agriculture of E Anglia and Denmark
81 Geographical similarities of N Sea coastlands
82 Physical and human factors in dairying in N W Europe
83 Climatic hazards of N W Europe and effect on human geography
84 Extent international boundaries relative to physical features
85 Cf geography Central Massif and Swiss Alps
86 Geography of Meuse basin
87 Cf geography Paris basin and N German plain
88 Factors in textile industries of France, Benelux, Switzerland and Germany
89 Cf human geography of Switzerland and Denmark
90 Geographical contrasts between N W Europe and S America

S America

ECUADOR, COLOMBIA, VENEZUELA, GUIANAS

1 Regional division of Guianas
2 Economic development of Guianas
3 Land use division of Venezuela
4 Mineral resources of Venezuela and extent exploited
5 Significance of towns in population pattern of Venezuela
6 Regional differences in Colombia
7 How far mineral exploitation has helped development of Colombia
8 Bogota and Barranquilla—setting and functions
9 Cf ways fuel and power needs met in Colombia and Venezuela
10 Relationships between physical and human geography in Ecuador
11 Cf Guayaquil and Quito
12 Transport in N Andean States

PERU, BOLIVIA, CHILE

13 Agricultural sub-division of Peru
14 How mineral exploitation has helped development of Peru
15 Callao and Lima—setting and functions
16 Mineral resources of Bolivia and extent exploited
17 Distribution of population in Bolivia
18 Differences in human geography of Peru and Bolivia
19 Nature and origins of post 1946 geographical changes in Peru and Bolivia
20 Nature and causes of climatic hazards in Chile
21 Agriculture in Chile as reflection of physical environment
22 Factors in distribution of industry in Chile
23 Cf Valparaiso and Santiago
24 Main features of external trade Chile

BRAZIL

25 Regional sub division of Brazil
26 Climates and effects on agriculture Brazil
27 Bases of recent power resource developments in Brazil
28 Factors in location of industry in Brazil
29 Manufacturing industry in Brazil
30 Cf Rio de Janeiro and Brasilia
31 Studies of São Paulo and Belem
32 Factors hindering economic development of interior of Brazil
33 Changing geography of Amazon lowlands
34 Post 1946 changes in plateau and far west of Brazil
35 Significance of railways in settlement pattern

36 Principal differences between geography of Brazil and rest of S America

ARGENTINA, PARAGUAY, URUGUAY

37 Regional sub division of Argentina
38 How and why Pampas differs from rest of Argentina
39 Land use regions in Argentine Pampas
40 Factors in distribution of industry in Argentina
41 Bahia Blanca, Buenos Aires, Rosario
42 Effects of world position and physical characteristics in development of Patagonia
43 Population in Argentina
44 Main features of external trade of Argentina
45 Factors hindering economic development of Paraguay
46 Resources of Uruguay and relation to overseas trade
47 Cf Paraguay and Uruguay
48 Asuncion and Montevideo—settings and functions

GENERAL

49 Structural features of S America
50 Climatic divisions of S America N of Tropic of Capricorn
51 Features and causes of climates of Argentina and Chile
52 Significance of trees in economic geography of S America
53 Cf W and E coasts of S America (Equator to Capricorn) with respect to physical and agricultural geography
54 Distribution and use of irrigation in S America
55 Importance of metals in development of tropical S America
56 Cf difficulties in mineral exploitation of Venezuela and Bolivia
57 Mineral resources of Andes and their development
58 Cf ways fuel and power needs met in Argentina and Chile
59 Difficulties facing growth of manufacturing in S American states
60 Main manufacturing industries in Brazil and Argentina
61 Population distribution in Ecuador and Peru
62 Cf Brazil and Chile coasts in respect of port development
63 Population distribution in Argentina and Uruguay
64 Extent to which, and why, population markedly coastal in S America
65 Cf characteristics and roles of Parana Paraguay and Amazon systems
66 River characteristics in S America and extent to which rivers used
67 Relation between major routes and physical features in S America

68 Importance of air, rail and motor roads in development of S America

69 Significance of plateaux in human geography of S America

70 Obstacles to further economic development of Andean States

71 Cf economic development of Guiana highlands and Brazilian plateau

72 Main economic resources of Argentina and Chile

CHAPTER 16

INTERNAL EXAMINING

THE function of examinations is to produce graded lists of performance Since all teachers are at some time concerned with the production of such lists, the art of examining needs considerable attention and understanding

There is little doubt that conventional examinations test the ability of the child to express himself Thus most examinations, albeit incidentally, are a test of written English Clarity of expression is likely to be a powerful factor in performance Most examinations offer the child an opportunity to show his recollection of facts For many children, indeed, the learning of information gained in class is the optimum of which they are capable, for such children it is possible that examination should be almost entirely limited to the reproduction of such information, or to the provision of data calculated to stimulate responses from the field of known factual information More able children can be expected to apply their knowledge, to order and arrange known facts for the solution of given problems For these children examinations should provide opportunity to show both the learning of facts and the ability to marshal them for use In general it might be said that examinations should test both memory and ability

Knowledge of geography also involves the learning of skills such as the drawing and interpretation of maps and graphs of all kinds, and the interpretation of photographs, statistics and descriptive data Thus the geography examination should not only provide a medium for clarity of expression in the recollection and ordering of facts, but for the handling of given data and the use of familiar skills The skill of the examiner lies in the balance he can preserve between the facets of geography and the variety of opportunity he can present for their practice

The amount of time allocated for the answering of examination questions varies with the age of the children concerned For first- and second formers a written examination in geography of

more than one and-a-half hours' length is in practice beyond their powers of concentration For third and fourth forms the time is generally two hours; for fifth forms a single paper may take three hours, but two two hour papers are sometimes given. The examiner must bear in mind, therefore, the length of time available and the number of questions which can be answered therein For younger children this may be a large number of questions requiring only short answers, for older children four questions can be set to be answered in two hours. Since the field of geographical knowledge to be tested is always wider than testing time permits, the provision of more than the actual number of questions to be answered permits the child some choice in what he presents for examination The number of questions on the paper should not be too great or the candidate may find difficulty in selection, or consume an unfair proportion of time reading through the paper for purpose of selection Experience shows that the answering of any two questions from a selection of not less than four and not more than six is satisfactory.

Given the length of examination time and the number of questions to be set the examiner must then ensure that all questions are of equal difficulty Each question must be answerable within the same amount of time and must involve an equivalent amount of thought The number of marks to be allocated to each question must be the same, for no child must be handicapped through choice of question. The only exception to this precept occurs when a compulsory question is set; this may be considered to be of sufficient importance to merit a few extra marks, all other questions must then have equal marks

The type of question set will be graded according to the age and ability of the children being examined School examination papers set for first, second and third year pupils generally contain simple questions relevant to the year's work The questions may be broken down into sections in order to help the children in

A (a) Name an important fishing area in the North Sea (b) Describe *one* method of catching fish in large numbers (c) Name any two fishing ports in the British Isles (d) Describe what happens to the fish after it reaches port.

B Describe and account for the salmon fishing industry of British Columbia

C With the aid of a sketch map, account for the development of the Norwegian fishing industry

the organisation of their material Examples may prove helpful. It will be seen that the geographical concepts expressed in the questions are of increasing difficulty, and that the questions vary in the amount of detail to be expected, the kind of detail required and in the application of reasoning For younger children questions largely require descriptive answers, although this will not always be the case Older children can be expected to write answers in which they have adjusted their greater variety of more detailed knowledge to a shape logically formed by the requirements of the question

Types of question are unlimited, it is the variety possible which challenges the teacher and adds interest to the setting of papers Most geographers would agree that by the end of the fourth year of a school geography course children should be able to write a geographical account, and a form of question demanding this has been in evidence in geography examinations since their inception The provision of outline maps on which information is to be shown has also long been popular, though world outlines are now in less favour than outlines of smaller areas demanding more accurate knowledge, the question being set so that the map forms only one section, a second section requiring written work linked to the requirements of the mapping The provision of an Ordance Survey map extract by means of which the child shows his ability in map reading is common The provision of other maps, for example of population, coalfields or land under crops from which the selection of data is required is a more recent extension of map reading, and often provides a good introduction to a second section of question requiring other detail not shown on the map It is not usual to expect children to produce statistical data in answers, except that some knowledge of actual figures is normally expected in the case of climates, but the provision of data which may be on climate, land use, exports and imports or on some type of production forms a useful source of questions The increasing use of pictorial material in the classroom means that the child's ability to interpret pictures may also be tested This testing may be by means of direct questioning on details of the physical or cultural landscape shown, or by the requirement of an annotated field sketch drawn from the picture Pictures selected for such purposes should be typical of the area they represent, indeed selection of the features which make them typical forms another possibility for the examination question

Once the teacher has in mind the types of question to be set, it is necessary to see that the distribution of questions covers, as far as possible, the work studied in the syllabus The teacher setting school examinations bas the advantage of knowing in advance what be can reasonably expect his pupils to know, no teacber is likely to attempt to test what has not been taught Examination papers which are regional in their approach will test knowledge of both pbysical and human geography in the setting of a continent or country Any paper set should include questions on the most important areas, these are often the most densely populated areas which have been studied most closely Yet the large, relatively empty lands should not be excluded, for they often present significant topographical features or illustrate particularly clearly man s adaptation to his environment The provision of full areal coverage is one of the goals of the examiner, often achieved by means of alternative questions or a choice of areas or topics in any one question Questions should also be distributed to test fairly the various aspects of our subject, such as pbysical geography, climate, industrial, economic geography and cartography, otherwise the balance of geographical teaching will be lost

The marking of examination papers should be objective In internal school examinations marking of all scripts on a single paper is best done by only one member of staff A marking scheme should be devised and adhered to Certain principles should be borne in mind The standard expected for a pass or satisfactory mark should be considered, and the scheme of marks devised so that this mark is obtained by the majority of the children This means a careful allotment of marks If the total is 100 marks and 4 questions are to be answered, 25 marks per question will be allocated These 25 marks should be re allocated in some detail Some mark scheme suggestions for the given questions (pages 349–353) may be useful

Question 1 (page 349) requires a straightforward geographical account It is a not uncommon type of question, but since such accounts can be learnt it leans heavily on memory It sbould perhaps be used infrequently, particularly since an essay lends itself to subjective marking of the kind to be avoided Such an account clearly requires a map, it then requires a formal setting out of paragraphs concerned with relief and climate, occupations both industrial and agricultural, and some detail on communications and trade The suggested mark scheme would set aside

5 marks for the map These should be awarded in a standard way, e g 1 for an accurate outline, 1 for relief, 1 for a named river and 2 for other locating features The locating features may well be of relief, towns, or a latitude line It must be realised that if an outline is not well drawn the accuracy of the whole map is affected, for this reason some would prefer to allow 2 marks as giving greater scope for subtleties of accuracy If, within the poor outline, the information is placed relatively correctly, the child should not be penalised again If, after the award of 5 marks, the map still has relevant information not credited, such as an isotherm or some details of exports, this should be considered in conjunction with the written text on climate or trade Marks for the text could well be a maximum of 5 for relief and climate, 5 for industry, 5 for agriculture, and 5 for other detail on communications and trade Full marks would not be gained for climate unless figures were given, nor for industry without locations It may be that the child has not tackled the question in the orthodox manner, but, having learnt about the major regions of Northern Ireland, presents his answer as a separate account of each In this case, if 4 regions are selected, this would give 5 marks per region, if 5 regions are devised, 4 marks each would produce the required total

Question 2 (page 349) is another well known type of question, testing the skill of interpreting climate statistics, and that of real geographical understanding by focus on the relationship between climate and peoples' lives Both sections require reasoning, hence marks could be divided into 13 and 12 For section (a) 6 marks might be allocated for describing differences of climate in terms of the seasons, certainly of winter and summer, 1 extra mark could be given for mention of the total annual rainfall of each station 6 marks are then given for accounting for differences in terms of ocean margin and continental locations, with relevant detail of air mass influence Section (b) requires mention of the effect of climate on vegetation and hence on occupations, on agriculture, on transport and possibly on winter clothing and housing The marks might well be 4, 4, 2 and 2

Question 3 (page 349) uses different data Section (a) is simple, requiring 18 items of fact Clearly it will be necessary to use half marks, thus (i) gains $1\frac{1}{2}$ marks, (ii) 3 marks, and (iii) $3\frac{1}{2}+1$ marks It is worth while noting here that if information is to be added to a map care must be taken not to overload this part of the question so that mark allocation does not overweight the

answer section Section (b), the more difficult part of the question, has 16 marks These could be divided between (i) and (ii) equally, or since (i) concerns two forms of transport it might be weighted at 10 marks, leaving 6 marks for (ii) In b (i) it is likely that children will find more differences than similarities, so that these could be given 6 marks, leaving 4 marks for comparisons The 6 marks for b (ii) could be gained for any three well developed reasons accounting for the pattern selected

Mark summaries should suffice for the remaining questions, with a brief explanation of any peculiarities arising In question 10, for instance, the map requires the insertion of A the Ardennes,

<table>
<tr>
<td>4. a. (i) 6×1 m.=6 m.
(ii) 2×2 m. 4 m.
b =15 m.</td>
<td colspan="2">5. a. 5×2 m.=10 m.
b. 5×3 m.=15 m.</td>
<td>6 a. (i) 4×2 m.=8 m.
(ii) 2×2 m.=4 m.
(iii) 5×1 m.=5 m.
b 4×2 m.=8 m.</td>
</tr>
<tr>
<td>7 a. (i) 4×1 m.=4 m.
(ii) 1 m.
b 10 m.+10 m. 20 m.</td>
<td colspan="3">8 a. Scale=2 m. Each column 1 m.=8 m.
b Name=1 m. Description 8 m. Reasons 6 m.=15 m.
c. 2 m.</td>
</tr>
<tr>
<td>9 a. (i) 2 m.
(ii) 6 m.
b 6×1 m.=6 m.
c. 4 m.+4 m.=8 m.
d. Name 1 m. Uses 2 m.=3 m.</td>
<td>10 a. 11 m.
b 14 m.</td>
<td>11 a. (i) 6 m.
(ii) 6 m
b 13 m.</td>
<td>12 a. (i) 3×1 m.=3 m.
(ii) 3×3 m.=9 m.
b 5 m.+4 m.+4 m.=13 m.</td>
</tr>
</table>

B the dune coastal area and C the polderlands One mark is given for the name Ardennes, and two marks for the quality of the area shown on the map This gives nine marks for A, B and C It is likely that the able child will add some other locating features to his map in order to help his placing of the required areas, for these allow two extra marks This gives 11 marks for (a), leaving 14 marks for any region selected under (b) In Question 12 (b) it can be seen that the total of marks is 13 although three features are to be accounted for In such a case it is customary to give the first feature written about the extra mark, since it is likely to be that known best to the candidate, hence its choice as first, and may most likely be worth an extra mark This is a more just allocation than a 'grace' mark given at the whim of an examiner, since this may even be forgotten

Q 1 Write a geographical account of Northern Ireland

Q 2

		Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
VANCOUVER 49° 30 N	Temp °F	36	38	42	47	54	59	63	62	56	49	43	48
123° 0 W	Rainfall ins	8 6	6 1	5 3	3 3	3 0	2 7	1 3	1 7	4 1	5 9	10·0	7 8
WINNIPEG 50° 0 N	Temp °F	−4	0	15	38	52	62	66	64	54	41	21	6
97° 0 W	Rainfall ins	0 9	0·7	1 2	1 4	2 0	3 1	3 1	2 2	2 2	2 2	1 1	0 9

(a) Describe and account for the main differences in the climates of these two stations

(b) Show how these types of climate affect the lives of people in British Columbia and Manitoba

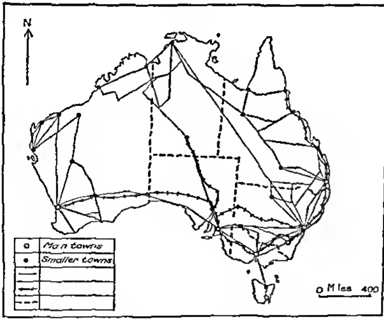

Fig 47 Map to accompany question on Australia

Q 3 (Fig 47)

(a) On the map of Australia

(i) Complete the key

(ii) Name the states of Australia

(iii) Name *all* the main towns shown and any *two* of the smaller towns

(b) In your answer book

(i) State the main similarities and differences in the distribution pattern of the two forms of transport shown

(ii) Account for the pattern of *one* of the forms of transport shown

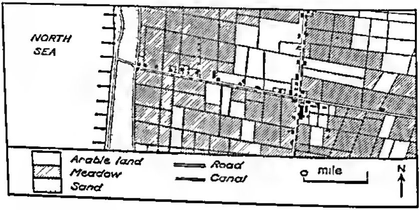

Fig 48 Map to accompany question on the Netherlands

Q 4 (Fig 48)

(a) Study the map and

(i) Show how the features seen on the map are typical of the western Netherlands

(ii) Give reasons why most of the land is under grass

(b) Account for the differences in land use of the eastern Netherlands compared with that of the west.

Q 5 Study the following passage

The mountain tops are often snow covered even in summer Below the snow lie broad 'shoulders', areas of rich pasture, pleasing to both sheep and cattle herder Below this extends the steeper zone of forest—thin strands of yellow pine with low shrub patches on the drier eastern slopes, and on the western a solid covering of moisture loving Douglas Fir, Sitka spruce and hemlock. These forests house lumber-camps, but logging is often a part time occupation for local farmers Their homes are farmsteads in the broad valleys, with strips of potatoes, wheat, barley, and alfalfa, often irrigated Animals pasture nearly everywhere at some time during the year—above the timber, in the timber and below the timber, for the lowest slopes of the mountains lie under grass, save where sunny slopes are planted with apple, plum and peach

(a) Draw a diagram of a Rocky Mountain valley and on it record the main geographical facts mentioned in the passage

(b) Show how the passage exemplifies the main features of life in this mountain area

Q 6

LAND	NORWAY %	SWEDEN %
Arable	3 0	9 0
Grassland	4 0	3 0
Forest	25 0	54 0
Other land	68 0	34 0

(a) Study the table, and explain
- (i) Why Norway has a lower percentage of arable land than Sweden
- (ii) Why Sweden has a higher percentage of forest than Norway
- (iii) What types of land in Norway and Sweden should be included as 'other land'

(b) Describe the industries associated with the forests of Sweden

Q. 7 (Fig 49)

(a) On the map
- (i) In the spaces provided, name the underlying rocks of the Central Massif shown in the key by numbers 1, 2, 3 and 4
- (ii) Name the soil numbered 5 in the key

(b) In your answer book, compare and contrast the ways in which man makes use of any *two* different areas of rock shown

Q 8

IN THOUSAND METRIC TONS					
Barley	65	Grapes	90	Potatoes	50
Citrus fruit	50	Olives	15	Wheat	80

Study the table which shows a year's agricultural production in a northern hemisphere island

(a) Draw a diagram to represent this information

(b) Name and describe the climate indicated by these products, stating reasons for your choice

(c) Suggest a likely location for the island

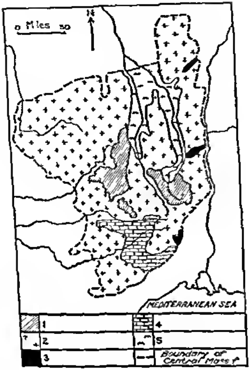

Fig 49 Map to accompany question on the Central Massif

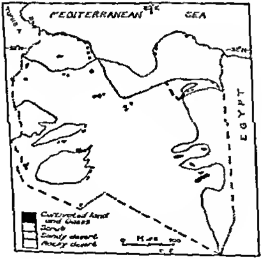

Fig 50 Map to accompany question on desert features in Africa.

Q 9 (Fig 50)
Study the map of Libya and
(a) Account for the presence of
(i) the cultivated areas along the Mediterranean shores,
(ii) the isolated cultivated areas inland
(b) What crops are cultivated in the areas referred to in (a)?
(c) Account for the formation of (i) rocky, (ii) sandy desert
(d) State the major vegetation belt of Africa of which the scrub areas form part, and describe how man uses them

Q 10 The descriptions lettered A, B and C are of three separate areas in Belgium

A The area consists of bleak, monotonous uplands, covered with heath, peat bog, or pine forest, with a scanty agriculture, small isolated market towns, and the lowest density of population in any part of Belgium

B There rises a long rampart of dunes with a steep uniform slope falling to the beach An irregular cover of vegetation consists of marram grass, patches of scrubby bushes, osiers, willows, gorse and aromatic shrubs, and here and there plantations of conifers

C Farms usually stand on ridges or hillocks away from the damp pastures, and with an occasional line of pollarded willows they form the only interruption to the sweeping open countryside The many dispersed villages each consist of little more than a nucleus of a church, an inn and a few shops, situated generally where a road crosses one of the many canals

(a) Draw a map of Belgium to show where the three areas are located, and *name* them

(b) Write a brief geographical account of any region of Belgium *not* named on your map

Q 11 (Plates xii and ii)
Study pictures A and B
(a) (i) What features of Picture A are typical of the landscape of the Fens?
(ii) Describe the physical features of the landscape in Picture B (Pennine moorland, west of Sheffield)
(b) What geographical factors account for the difference in land use in the two areas?

Q 12 (Fig 51)
For *three* of the physical features A, B, C, D
(a) (i) On the lines provided, name the type of coast shown
(ii) Label clearly the parts of the features which help to identify them
(b) In your answer book, account for the mode of formation of the three physical features selected [1]

The setting and marking of school examinations is often considered to be a time consuming task which unfortunately cannot be avoided There can be no doubt that the construction of a well chosen series of questions, expressed clearly, open only to the one required interpretation, balanced to present all aspects of geography, and covering the syllabus, does take time The teacher can, however, feel that this time is not wasted, for he has provided

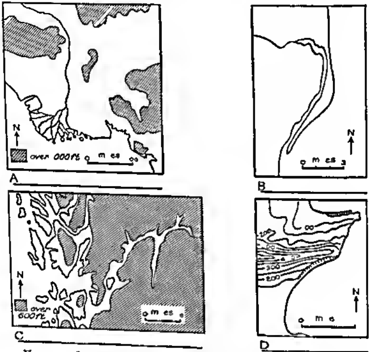

Fig 51 Maps to accompany question on coastal types

the children, not with the opportunity to write out yet again what they have already learnt, but with the opportunity to think about what they know of real geography The time spent in devising a mark scheme means that the teacher can rest assured that he has done everything possible to ensure a just allocation of marks, so that his examination mark list really is an accurately graded list of performance

Objective Testing

The objective tests most familiar to teachers in this country are those developed as part of the 11 + selection process In essence, they are tests to which there is only one correct reply,

and there is no possibility of candidates receiving different marks from different markers There are many forms into which they can be cast, but most commonly the candidate is required to select one correct response from a number of possible answers It takes great skill and much time to construct them, and each item should be validated by means of a pilot test Their marking is routine clerical checking, and there are mechanical means of doing this It is clear that they are economical of the examiner's working time only when used on a large scale For internal school examinations this advantage is at the minimum, unless large supplies of the papers set are kept secretly and used for several years [2]

Objective testing has been most developed in the United States, where large numbers of candidates, for example for college entrance, must be handled on a standardised scale In most American schools geography and history are timetabled together as social studies Geography as such is in general not so highly developed as it is in Britain As a result American objective tests in geography have not progressed so far as those in other subjects The majority of the tests, when examined, are found to be testing purely factual knowledge, or the understanding of mathematical or scientific matters, such as latitude, longitude, rainfall or insolation

There is a fundamental difficulty n devising objective tests in geography owing to the nature of the subject At school level, there is a descriptive and factual element which can easily be tested objectively, but there is also a relational or synthesising element without which geography would become intellectually sterile Geographical relationships can seldom be isolated, and a geographical synthesis up to the present has been presented by written account, examined by the essay type answer The traditional question forms 'comment on', 'account for', 'show how' and 'give reasons for' require the candidate to make his own synthesis, and to evaluate the various factors concerned This ability to synthesise, and to select relevant factors, is also manifested in the drawing of sketch maps, surely a vital medium of geographical expression Objective testing of this has not yet appeared

Attempts have been made to construct items which test knowledge of this relational aspect of geography They often require the candidate to select a correct relationship, or a correct explanation for it Examples are

1 Underline the phrase which you think makes the best answer If possible, roads avoid (i) gaps through hills, (ii) firm dry soil, (iii) land liable to floods, (iv) fertile land, (v) a straight course

2 Underline the phrase which you think makes the best answer Market gardening is carried on near great cities because (i) the soil near great cities is more fertile than in the country, (ii) glass bouses can be built, (iii) the needs of the huge population of great cities make market gardening pay, (iv) city people know how to cultivate well, (v) temperatures are higher near great cities than in the country

As in all tests which involve explanations there is no guarantee that the required explanation has not been learned by rote, and reproduced without understanding A greater difficulty in constructing an objective test item involving a geographical relationship is that in order to ensure there is no doubt about the correct answer the relationship must be a simple one, and the wrong responses offered must have little or no element of truth in them This is normally not the case, there are many factors which play their part in explaining geographical phenomena, and geographers debate their relative importance This makes objective testing and marking of any but the simplest ideas extremely difficult, if not impossible

More successful has been the objective testing of geographical skills and of the ability to apply geographical knowledge This has been done by the provision of geographical data, particularly in the form of maps or pictures and to a less extent of statistical data and written descriptions Examples are

1 (Large scale map extract) The main area of marshy ground is (i) at map reference 123456, (ii) on the top of a hill, (iii) alongside the river, (iv) along the coast, (v) in the centre of the town

2 (Air vertical photograph of rural Iowa) The photograph was taken in the region known as (i) the Laurentian Shield, (ii) the Corn Belt, (iii) the Arizona Desert, (iv) the Rocky Mountains, (v) the Appalachians

3 (Written description) 'The small fields are the basic agricultural units of this part of France, whether under arable cultivation, temporary or permanent grass, market gardens, or apples The arable fields are located near the sea, from the coast shelly sands can be obtained for sweetening the acid soils and lightening the clays, and seaweed is used as a fertiliser Here are the sheltered pockets of early vegetables, more profitable than cereals, capitalising the early springs

and the relative freedom from frost Further inland, less cultivation is found on the poorer soils, and under the bleaker climatic conditions, consisting merely of some patches of potatoes, cabbages and the poorer cereals rye and buckwheat'

The coastal district described is (i) the Landes, (ii) the Rhone delta, (iii) Brittany, (iv) the Riviera, (v) the coast of Picardy

4 (Monthly temperature statistics)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
A °F	76	76	80	83	86	84	81	81	81	82	81	77
B	21	20	25	34	46	57	62	60	52	42	32	25
C	45	45	47	50	55	60	65	64	61	56	50	46
D	62	62	59	54	49	47	46	47	49	53	55	59
E	55	57	63	70	76	80	82	82	78	74	65	58

The only place located in the Southern Hemisphere is (i) A, (ii) B, (iii) C, (iv) D, (v) E

It can be seen that even with these tests, the difficulty already noted still tends to occur As a result, only questions at an elementary level can be safely cast into objective form The answers to those involving more subtle relationships can be legitimately disputed by geographers

A compromise is evolving in British public examinations Facts are written or identified on maps, diagrams and other pro-formas, and their marking is virtually objective An increasing emphasis on the testing of skills, the understanding of relationships, and the application of knowledge is shown by the provision of data, particularly the picture and the written description, for interpretation The essay type of answer is still included as the chief means of testing the candidate's ability to synthesise and evaluate his knowledge There is an increasing tendency, in the interests of standardised marking, for the question form to force a breakdown of the written account into a number of subsections It may be that this tendency is putting a discount on an essential characteristic of geography

The Presentation and Examination of Topic Work

The introduction of topic work in the C S E examination (pages 304–305) represents a departure from traditional school examination practice It is suggested by some Boards that the topic work should be undertaken during the two years preceding the examination Most of this work will be undertaken in the pupils' own time, but some class time will need to be set aside

for the teacher to give individual and collective guidance This guidance is essential if the children are to produce a piece of work that is worthwhile It is suggested that if the teacher keeps an eye on the development of the topic, the final assessment will not prove such a burden

Some Boards offer suggestions as to bow the child should approach his topic work. It is apparent that the books and material available are of great importance, the choice of the child is likely to be influenced by the availability of source material, or the ease with which it may be obtained The pupil is advised to prepare a provisional plan, if a country is chosen the traditional geographic headings of position, relief, climate and so on may be used For a product one might consider areas of production, geographic conditions which influence production, methods of production, uses and trade The children will then collect a file of notes, pictures, pamphlets, maps, diagrams including sketches, and arrange them under the appropriate headings The writing up stage is the one which pupils will find most difficult, we stress the importance of selection, since without it the topic file becomes a scrapbook

It is intended that children should have a free and wide range of choice of subject matter, and clearly their plans will vary accordingly The following, which can be duplicated and given to candidates at the beginning of their work, offers a plan for those who select a country

SUGGESTIONS ON HOW TO MAKE UP A FILE ON THE COUNTRY YOU SELECT

1 *Locate country*, i e show where it is

(a) in words, with reference to neighbouring countries,
(b) on a map
(c) using latitude and longitude

2 *How can one get there?* (By land, sea, air)

(a) Maps to show routes from your nearest big town
(b) Description of the journey there, i e the ports you would pass through, main towns on the route
(c) Sample timetables—get detailed information of times and prices from a travel agency

3 *What is the country like?* (Which parts are mountainous, upland or lowland?)

(a) Describe it in words

(b) Draw a map to show it

(c) Show it in pictures You can place pictures on a map, or draw a map to show where the pictures were taken, or quote a description from a text book, a travel book or a magazine

(d) Are there any special problems, such as mountain barriers, volcanoes or earthquakes? If so, say why they exist, how they affect the people, and how these problems are overcome

(e) Does the land need drainage or irrigation? Do floods occur? Use pictures or drawings to explain why or how

(f) Are there large areas of forest, or grassland, or desert? Describe them, saying where they are Make sketches from pictures and label them to explain their features clearly

4 *What is the climate like?* Describe it by

(a) pictures,

(b) written descriptions of the seasons,

(c) temperature and rainfall graphs,

(d) seasonal charts or circular diagrams

Show how the weather affects the lives of the people, e g does fine weather encourage tourists? Does winter snow encourage winter sports? Is any part of the year too cold for growing crops?

5 *What are the people like?*

(a) Write an account of 'A day in the life of ' e g a countryman, a worker in a town

(b) What sports do they enjoy? Include pictures

(c) Is their everyday clothing different from ours? If not, do they ever wear national costume? Include pictures

6 *What do they work at?* Are they mainly farmers, fishers, hunters, miners, factory workers? Are they lumbermen? Do they rear animals?

(a) Write an account of a farm, a factory

(b) Describe the ways in which they farm, fish, mine, etc

(c) Draw maps to show important manufacturing towns

(d) Draw diagrams to show what percentage of people are engaged in various occupations Information can be gained from (i) *The Statesman's Year Book* (in libraries), (ii) text books, (iii) travel pamphlets (Ask for advice from your teacher on this subject)

7 *Where do they live?*

(a) Write a section on the capital city, with maps

(b) Draw diagrams of house types, add written notes on your diagram to explain why the houses are built in this way

(c) Can you find a population map of the country? If so, try to explain it

8 *How do the people travel?* Which are the main ways—by road, rail, river, sea or air?

(a) Map the main railway lines, or the main roads

(b) Draw a map to show the main ports and sea routes

(c) Describe a journey, e g using pack animals, camels, dogs, mules

9 *What does the country buy and sell?* Imports and exports are given in *The Statesman's Year Book*

(a) Draw graphs to show these

(b) Explain why the imports and exports are of certain types of goods

(c) Draw a map to show the main countries traded with

10 *Write a Conclusion* This should be a summary of the main points of interest about your country

It is hoped that the suggestions above encourage the child to include a variety of methods of presentation Only material of significance should be included, and the purpose of the maps, sketches, diagrams and pictures should be explained in words, i e their use A well presented topic file shows the integration of maps and pictures with the text A brief introduction stating the aims of the topic should appear at the beginning, whilst it is important to have a bibliography at the end

Country		*Topic* (e g commodity)		*Others* (e.g rivers, airports, irrigation)	
Originality	10	Originality	10	Layout	10
Neatness	10	Neatness	10	Integration	10
Effort	10	Effort	10	Originality	10
Location and how to get there	10	Introduction	5	Contents—	
What country is like	10	Areas of production	10	a Introduction	5
What climate is like	10	Methods of production	10	b Illustrations	30
What people are like	5	Geographical conditions		c Written work	30
What they work at	10	relief	5	d Conclusion	5
Where they live	10	climate	10		
How they travel	5	soil	5		
What country buys and sells	10	labour	5		
		Uses	10/5/15		
		Trade	10/15/5		

Topic work is in most cases marked first by the teacher, and a standard scheme for work of such varying pattern is difficult to devise In addition to the value of the factual content, marks may be given for that of the neatness, design, quality of presentation, originality or integration of illustrations with text The relative weight given to these latter qualities will vary between teacher and teacher, or indeed between the directives

of the various Boards. The schemes on the opposite page are subjective, but may offer guidance in a relatively new field. Some such scheme is needed in order to obtain a good range of marks and some degree of objectivity and standardisation It might be noted also that in most cases proper assessment should produce marks which show a normal curve of distribution. To obtain this, the majority of candidates should receive marks near the middle point.

NOTES

[1] University of London School Examinations Council, G C.E Ordinary Level Geography Papers, 1961–4.

[2] More general accounts of objective testing may be found in Vernon, P, *Intelligence and Attainment Tests*, U L.P, 1961

CHAPTER 17

EXTERNAL EXAMINATIONS

THE GENERAL CERTIFICATE OF EDUCATION

O and A level examinations, or their equivalents, have been well known for some fifty years, and many universities have been concerned with examining for far longer than this A pamphlet entitled *G C E London The Work of the University Entrance and School Examinations Council*, published in 1964 by the University of London, gives full details of examination procedure of the present time The standards of the Examining Boards are accepted by the general public, employers and the professions At the same time this general acceptance of the examinations has tended to obscure their original purpose, which was 'to test the successful completion of a course of liberal education, viewed primarily as a preliminary to the various forms of higher education' [1] Nowadays, success in this public examination is increasingly sought by pupils for whom it is not designed Thus compared with 739 000 entries in the G C E O level examination in the summer of 1951, there were 1,833,000 in the summer of 1962, this increase being considerably greater than the increase in the numbers of school pupils of the relevant age, and entries continue to increase Yet despite its evident success in terms of public recognition, the examination is constantly under criticism

One of the most common criticisms is that the school curriculum is too much the servant of the examinations In terms of geography, this means that the examination syllabuses dominate the geography teaching Let us examine an O level syllabus

Candidates will be expected to have studied an area of which they can gain first hand knowledge, and opportunity will be given on each paper for such knowledge to be shown in the examination

Paper I 2 hours

Candidates must answer four questions, including one on the Ordnance Survey map

(a) Map reading and interpretation with special attention to Ordnance Survey maps on scales of 1 inch and 2½ inches to the mile

(b) The physical and human geography of the British Isles

It is expected that (a) and (b) will be studied in conjunction with one another

Paper II 2 hours

Candidates must answer four questions, choosing two from each section

(a) The physical and human geography of *either* North western Europe (France, Belgium, Luxembourg, The Netherlands, Germany, Switzerland, Denmark, Norway, Sweden) *or* North America (Canada and the U S A)

(b) The outlines of the physical and human geography of the world

Questions on both physical and human geography may be set in either section of either paper on topics which may include the earth as a planet in relation to the sun, latitude, longitude and time, the relief and surface features of the land, chief landforms and the agencies modifying them, chief surface movements in oceans and seas (omitting theories of tides), elementary weather study based on local observations and weather maps, the chief factors which affect climate, the major climatic, vegetational and human regions, the major occupations and activities of man in relation to his geographical environment, the distribution of population and the growth of large towns, and the principal means of transport

This syllabus is not intended as a substitute for a school syllabus It does not tell teachers when to teach what, or how to teach It is intended as a summary statement of what the able sixteen-year old might be expected to know at the end of a five year school course Moreover, this syllabus is not imposed by a university remote from knowledge of school courses, it is the result of careful deliberations of examiners and teachers' representatives, it is, in fact, devised by geography teachers If the school syllabus given on pages 289 to 303 is studied, it becomes clear that it covers all that is required for O level, and there is no reason to suppose that a pupil who had progressed by means of such a syllabus would not be able to tackle the examination with every hope of success Of course the teacher preparing the children for O level will give them practice in answering O level questions for homework in their fifth year, indeed, revision of Europe or North America might well be undertaken on these lines Again, the final school examination before O level would

doubtless be a 'mock' examination of similar type Gearing part of the school work in the fifth year towards O level in this way is a far cry from letting the examination syllabus dominate the whole school course If the teacher considers that acceptance of the requirements of the given O level syllabus robs him of freedom of choice in his teaching, he can present his own syllabus for approval by the Board concerned, and have a paper specially set on the work of that syllabus Very few teachers of geography appear to avail themselves of this opportunity, and it is unlikely that the small fee charged acts as a deterrent.

A second common criticism is that the Examining Boards are out of touch with schools, or that teachers have no say in an examination for which they prepare the candidates In practice, teachers prepare the syllabus, moreover teachers are encouraged to send in their comments on all matters concerning the examination to their representative associations, for communication to the Boards In practice, too, most chief examiners, who set the actual papers, are themselves teachers, either in schools or universities They have normally many years of experience as assistant examiners, and in setting papers and conducting examinations for other public bodies They work in close conjunction with a moderator, always a person with great experience of teaching and examining The moderator and chief examiners discuss the question papers to be set in great detail, the papers are further sent to scrutineers, also teachers of experience, for criticism, comment and suggestion

Disappointed parents, teachers and candidates have been known to cast doubt on the judgement of those marking the papers of O and A level examinations No one would suggest that examinations are infallible, but it is possible that numbers of teachers are not fully aware of the zealous attempts of the Examining Boards to ensure that full justice is done to the candidates The Boards normally have large panels of experienced markers These assistant examiners are possessors of honours degrees, they have had substantial appropriate teaching experience Indeed, the great majority are practising teachers, the remainder are mainly lecturers in the subject in universities or in colleges of education It is doubtless fashionable for teachers who mark to disparage their motives in the staffroom, where the inducement of extra money is given as the sole incentive, but the majority of assistant examiners are interested in the work and have the welfare of the candidates at heart. They themselves

normally have pupils taking the examination, and are disposed to see the child's point of view before that of the chief examiner

Marking proceeds, in general, after this fashion The assistants receive the examination question paper in sufficient time to enable them to work out all the answers, drawing the necessary maps and diagrams, before the meeting of all the assistants with the chief examiner takes place They also receive their scripts, which they scrutinise but do not mark This enables them to see likely difficulties, the different ways in which candidates have tackled questions, the types of facts given, and other details At the examiners' meeting, which lasts a full day, the chief examiner presents his mark scheme, a scheme which has taken considerable time to prepare, and which has been adjusted if necessary in the light of the scripts the chief has seen Each question is taken in turn, and the marks allotted with respect to the type of information expected in the candidates' answers The allocation of marks is discussed freely by all the assistants, adjustments are made by common consent, and all possible variations of answer are considered and accounted for The assistants make detailed notes of the proceedings, and are all committed to rigid adherence to the final scheme of marks The success of all marking depends on the reliance which can be placed on their ability to keep to the mark scheme, this must be so carefully adjusted that adherence to it is possible for all scripts After the completion of the mark scheme, the assistants often mark some scripts, these may be photostat copies of sample scripts This work may be done in small groups, encouraging discussion and agreement on the allocation of marks It is carried out under the direct supervision of the chief examiner

Throughout the marking period the assistant examiners send batches of scripts to the chief examiner for scrutiny and advice They are also in telephone contact with him for discussion of any problems arising from individual scripts Should any assistant's marking be found to fall short of the standard required, the chief examiner will then need to re mark the whole batch of scripts In practice, since assistants are chosen for their reliability, and since particularly close watch is kept over beginners, this seldom happens, but it has happened At the end of the marking the markers send to the chief detailed reports of the scripts they have marked These reports analyse common errors and difficulties, enumerate the questions answered most successfully, and

present an overall picture of the achievements of the candidates From these reports the chief examiner puts together the final report to be published by the Board and sent to all schools pre senting candidates for the examination

The administrators have meanwhile been far from idle The addition of marks on scripts is carefully checked, any end page or piece of work which may have escaped the notice of the examiner is discovered, and the script returned for the completion of the marking Finally, graphs of the results of each assistant s marking are prepared, most of them show a normal curve of distribution If they do not, the chief examiner re checks the necessary scripts to see that the abnormality is a valid one, resulting from the candidates' work The chief examiner has a meeting with the chief administrators, reports to them on the work in general, answers any queries arising over individual scripts, and checks scripts the English of which is considered to be below standard For many years borderline cases have received a second scrutiny undertaken by the chief examiners

Opportunity for becoming an assistant examiner is open to any graduate with a good honours degree and appropriate teaching experience Many teachers welcome the opportunity that the work offers for meeting their colleagues, discussing the papers seeing the type of work required from candidates, and gaining insight into the work presented by schools other than their own Advertisements appear from time to time, once accepted for the panel of assistants, the teacher can be invited to mark, and may continue marking for many years No teacher marks the work of his own school, indeed the schools, to the marker, remain anonymous

Further criticism is often levelled at the questions set We first consider that aimed at A level questions, which require deeper interpretation than O level questions, in which is given much more guidance towards the structure of the required answer Often this criticism occurs because the teacher is thinking in terms of an answer more difficult than that envisaged by the examiner It may be worthwhile to consider here what A level examiners are aiming at, what in fact they want from potential examinees

The examiner wants some knowledge of geographical skills and techniques He sets problems needing solution by the use of such skills There are books on the interpretation of large-scale maps, but practice is needed in such interpretation, in the

include irrelevancies about transport on the Seaway, suspect as rote summaries learnt with little thought The form of the rote learning is not necessarily under the systematic headings quoted above, a common teaching arrangement of the geography of British Columbia is by occupations, and these dominate accounts to the exclusion of other aspects of the region

Further, rote learning of short, cram summaries appears to be of little assistance to knowledge of vegetation There is often confusion between a vegetation region and the vegetation itself 'Here the vegetation is sandy desert' If the candidate is asked to draw a map to show vegetation regions, a key merely stating 'Mediterranean and 'desert' gives little indication of what plant life is associated with those regions Accounts of equatorial forest seldom contain reference to types of tree other than mahogany, save that teak is frequently named as typical Little is known of monsoon vegetation, whilst the vivid contrast between the savanna of the wet season and that of the dry is seldom remembered Some candidates still confuse crops with natural vegetation

The errors so far discussed have been those associated with regional geography There are also errors associated with mathematical geography (discussed in chapter 10) and with physical geography In examination, candidates are sometimes asked to describe a given physical feature, sometimes to explain the way in which it was formed They are normally much better at explaining than describing, indeed, candidates often confuse the two Similarity of wording in explanations given throughout the answers of whole schools suggests dictated notes rather than intelligent reasoning, whilst poverty of description indicates that 'knowing what it is like' is sometimes neglected, or that children need more practice in simple descriptive writing Candidates may further be asked to name an example and to draw contoured sketch maps of e g a U shaped valley with a hanging valley, or a corrie with a lake or tarn The type of diagram desired is quite simple and takes relatively little drawing time Candidates commonly omit contour numbers or number the contours at an unsuitable altitude That they are not taught to draw from real examples shown on topographical maps is evident, for very rarely does the example given by name tally with the contour map drawn as an illustration Again, such diagrams are often inadequate (Fig 52)

The diagram of the corrie lake recalls other errors of inadequacy

A common type of question is 'Describe, with the aid of carefully labelled diagrams, three ways in which a lake may be formed Locate an actual example of each type described' Candidates often select three lakes which are of the same type, e g formed by an obstruction across a stream—a landslip, or tree trunk or a dam They are also then hampered by lack of examples Some times ox-bow lakes are selected, but few are known by name

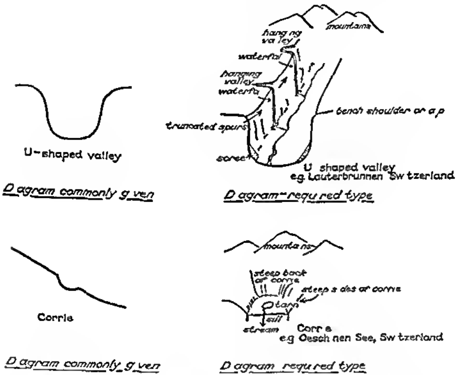

Fig 52 Glacial features inadequate and adequate diagrams

There are still many candidates, even at A level, who have an adequate knowledge of the theory of the origin of landforms but who do not relate this knowledge to real places Many candidates also fail to gain marks not because what they have written is incorrect, but because it lacks sufficient detail, be it of description or explanation

There are, in examinations, a number of errors made which indicate incorrect understanding There are dozens of such errors which could be given as examples, they are particularly in evidence in A level papers because the level of understanding necessary is higher than that previously required Such errors

include the description of boulder clay, clints and grykes as landforms, cirques as glaciated lakes, or the implication that all gorges are the collapsed roofs of caverns, or that cuestas are exclusively limestone landforms The term 'soil erosion' is often misunderstood and provokes answers dealing with the factors of sub aerial denudation in general, it is not customarily meant to include the removal of soils by ice sheets, deflation in existing deserts, normal mass wasting and solifluction Super imposed and antecedent drainage are not patterns but modes of origin There is frequently confusion between deposition and erosion, particularly with regard to glaciation

It will be clear, even from this necessarily brief résumé of candidates' misconceptions, that errors fall into three main categories First there are those associated with language These include failure to interpret the question correctly, failure to express the answer in clear English, and failure to arrange the known facts in the form or order best calculated to answer the question set Second, there are those which indicate lack of knowledge or understanding of the subject There is failure to state accurate facts, the stressing of minor facts at the expense of more important ones, the omission of relevant and necessary detail, and failure to recognise essential relationships A third category, not the least important, results from arid geography, geography which lacks contact with reality The most handicapped candidate is he who has no idea of what the place about which he is writing is really like

The Certificate of Secondary Education

The extension of the public examination system by the establishment of the C S E is an event which will have far reaching effects on schools in England and Wales After careful consideration of the merits of external examinations, the Crowther report[2] in 1959 recommended in cautious language that for some pupils an examination below the level of the General Certificate of Education 'might serve a useful purpose' In 1960, the Beloe Committee [3] which had been set up in 1958 by the Secondary Schools Examinations Council, recommended the introduction of a new examination to supersede the variety of existing examinations below G C E level The Fifth report[4] of the Council in 1962, and the Seventh in 1963 made further recommendations in detail and the mechanism of the new examination, by means

of Regional Boards, is now established Some Boards offered an examination in 1965, others commenced in 1966

The major feature of the new examination is that it is directly controlled by teachers This additional opportunity for control of their academic work is a considerable furtherance of their professional status and independence The regional constitutions vary slightly from area to area, but in all cases there is a majority of teachers on each Board and also on the panels which are responsible for drawing up the syllabus, and conducting the examination, in each subject There is also an elaborate and less formal system of consultation with local teachers, particularly at subject level, by means of smaller groups Further opportunity for the independence of teachers is given by the provision that individual schools, or groups of schools, may offer their own syllabus and examination

Another feature is that by a careful formula of words, there is an attempt to avoid the pass or fail concept Results are published, by subjects, in five grades At least one grade 4 gains a certificate Grade 5 is a 'near miss' Grade 1 is to be awarded to a sixteen year old pupil 'whose ability is such that he might reasonably have secured a pass in the O level of the G C E examination, had he applied himself to a course of study leading to that examination',[5] grade 4 to one 'of average ability, who has applied himself to a course of study regarded as suitable by teachers of the subject as appropriate to his age, ability and aptitude'[6] Performances below 5 are to be classified as 'ungraded' and indicate that the candidate should not properly have been entered The upper level refers to well known standards What the lower level will be remains at present problematical The Secondary Schools Examinations Council has given detailed guidance on this and many other matters in its Examinations Bulletin No 1 This is the main guiding document at present for all concerned Subsequent bulletins give detailed consideration of particular topics, including geography testing

The process of establishment of the Boards was interesting, and not without effects upon the future It was laid down that the area of a Board should not coincide with that of a Local Education Authority In the early stages, the existing administrative machinery of some authorities was used until the new secretariats could be established Although constitutional arrangements varied, the majority of members of each Board were nominated by teachers' organisations and local authorities The

Boards then in turn nominated other teachers to serve on the local panels

Although during the formative stages in 1963 and 1964 there were many preliminary meetings held for teachers, it would be false to pretend that all knew what was happening Those particularly interested in teachers' affairs played a full part, but they were not necessarily those interested in the details of a given subject In most cases, by some means or other, enthusiastic subject specialists now form the subject panels, but this is not entirely the case There are still many who are unaware of the precise methods of recruitment and representation to the panels These subject panels have crystallised, and there is some risk that they will become remote and authoritative bodies, against the doors of whose regulations the ordinary teacher will beat in vain.

For the many who did take part, the discussions of the local sub groups which met to devise the new geography syllabuses were stimulating and rewarding Those who were teaching children below O level standard now had a chance to formulate and implement their ideas, particularly in terms of content, and to a less extent, in terms of method At first these draft syllabuses varied enormously but the Examinations Bulletin[7] offered suggestions, and most of the syllabuses which are now published show considerable traces of its influence Most include a substantial section on the local region, with further work on the British Isles There are many and varied attempts to devise a reasonable formula for more general world cover, but some form of options from selected world problems in their geographical setting is perhaps the most common feature

To review the processes of discussion by which many teachers finally arrived at agreed syllabuses would be an impossible task, but some indication of the main forces at work is of interest Many considered first the purpose of geography teaching, resulting in such concise statements as 'to arouse and promote an awareness of and interest in the world around, to develop an understanding of the simple relationships between natural phenomena and human activity, and to develop the elementary skills of geography'[8] Others were less precise, but all showed that geography, at least in the minds of teachers, if not of the general public, has advanced far beyond the old conception of a knowledge of facts and locations There was also wide agreement on the importance of the study of large-scale maps, and this was usually allied to some detailed study of the local area or region

There were, broadly, four problems arising, and the panels either took decisions in principle or produced compromise solutions, often by means of options They were first, the regional or topic layout, second, the content of world studies, third, the place of systematic studies, particularly physical geography, and fourth, the provision for special interests, such as meteorology and geology These problems were often intermingled For the British Isles, most Boards have worked mainly on regional lines, with options on general topics such as farming, industry, power or population One Board produced the compromise solution of items such as 'agricultural studies in their regional setting', naming a suitably limited number of appropriate regions The second and third problems are closely related Most Boards finally offered subjects which require a world view, either by the study of selected sample areas, or of economic or other problems of world wide incidence Some sub divide the general paper into mathematical, physical, and other sections, which may make for an unfortunate lack of integration in the work as a whole One interesting suggestion was the inclusion of a set book of a quasi-geographical nature In practice, by means of options, most teachers will be able to select what they want to do If this is not possible, they can, of course, submit their own syllabus

One different type of problem was that of the relationship between C S E and G C E work There would clearly be marginal classes, or groups of pupils, for whom a decision about which examination should be taken could not be made until fairly late in the school career Beloe did not take a final decision on this, and left the matter to the discretion of the schools A C S E syllabus too remote from O level might prevent these marginal children from ever sitting the higher examination A syllabus on formal, academic lines would defeat the purpose of the new one The influence of this problem is apparent in the final syllabuses In most cases, by selecting appropriate options, good classes pursuing a C S E course in geography can if they make sufficient progress, advance without serious problems of content to O level

The panels are now producing question papers, and in this sphere the implementation of new ideas is striking These developments had already been foreshadowed in some G C E papers [9] A further lead was given in the Examinations Bulletin [10] 'Some of the questions should be designed to test the ability of the candidate to handle source material of varying kinds Such

questions might well include work on a photograph, or large-scale map, or distribution map, or set of climatic, economic or demographic statistics or a paragraph of first-hand description.' It can be seen that the tenor of this idea is in harmony with the methods already elaborated. Broadly, the essay-type answer is not required. The commonest question form requires a series of fairly short answers, often based on the completion of a map, diagram, or other pro-forma, or requiring study of the kind of geographical raw material listed above.

In some Boards the use of an atlas in the examination is being considered, as is the possibility of an oral map-reading examination in the field. Many other questions suggested are equally interesting. A sketch-map of local coastal detail tests knowledge of physical geography in its known setting; a map of the tanker distribution of mineral oil offers ample scope for testing map-reading, knowledge of facts and world relationships. In spite of early difficulties in reproduction, pictures are being widely included. Field sketches as a basis for questions or annotation are beginning to appear. Other sketches, such as details of house construction, are an alternative to pictures, particularly when the right picture is not available. The provision of climatic graphs as a basis for questioning and comment is well known. There are interesting developments in the analysis of verbal data. One question requires candidates to discover evidence of glaciation in the place described (page 236). A more direct opportunity to exhibit ability to apply knowledge is given by the request to identify the region described. The most detailed and specific example of applied geography is the provision of complete sample study data, by map, picture and statistics, with a series of appropriate questions.

Many panels have not yet made field work compulsory. Although enthusiasts advocate this, the majority of teachers do not appear to welcome it, and field work is usually left as an option, alternative to some other form of special study, to be presented as course work by the candidate. Unfortunately, subject panels for several other subjects require the submission of a substantial piece of course work, and there is grave danger that the children may be overburdened by this. Many advances in geography teaching have been pressed by their introduction into examinations. The study of large-scale Ordnance Survey maps, and of pictures, are notable examples. The climate of teacher opinion appears to indicate that for the moment, at any

rate, the time is not quite ripe for the forcible introduction of field work

A major problem for the future is that of setting standards These have been defined in the general terms already quoted, but it will be for the Boards and their examiners to implement these general terms in practice There are many examiners who can assess from experience a grade 1 script Experiments are in progress, whereby, by means of general ability tests and others, the standards of C S E grade 1 and an O level pass can be more exactly equated The ability which produces grades 4 and 5 has never yet been tested in this formal way Too low a standard will discredit the examination in the eyes of the general public, particularly employers Too high a one will defeat its purpose by discouraging the entrants It is not reasonable to expect for the moment in the C S E the exact standardisation which exists in the established public examinations It may not even be necessary or desirable [11] In spirit, the new examination is intended to offer a certificate of having followed satisfactorily a five year course of secondary education suitable for a child of average ability Provided it is not asked to do more than this, it will succeed

NOTES

1 Ministry of Education Reports on Education *Examinations and the Curriculum* No 4, October 1963 p 1

2 Report of the Central Advisory Council for Education in England 15 to 18' (The Crowther Report) H M S O, 1959 p 88

3 *Secondary School Examinations other than the G C E* (The Beloe Report) H M S O 1960

4 The Certificate of Secondary Education Notes for the Guidance of Regional Examining Bodies H M S O 1962

5 Examinations Bulletin No 1 The Certificate of Secondary Education H M S O, 1963 p 9

6 *ibid*, p 9

7 *ibid*, p 45

8 Portsmouth teachers' group draft syllabus

9 e g University of London 'O Level and University of Cambridge 'A' Level Geography Papers 1961, and onwards

10 p 45 (para iv)

11 See Cope, E The C S E some positive aspects' *Education for Teaching*, Nov 1964 pp 41 44

CHAPTER 18

MECHANICAL AIDS

SINCE 1945 there has been a great development in mechanical aids to teaching It is not intended to review, in this chapter, all these modern aids Information about epidiascopes, miniature diascopes, overhead projectors, loop film or 'short cycle' film projectors, duplicators, photocopiers and mapographs can be found in the *Handbook for Geography Teachers* (pages 134–142) The most commonly used aid we believe to be the filmstrip projector, and we have already discussed the filmstrip and its uses The overhead projector is a new machine which we discuss on page 397 The use of tape recordings gives new possibilities for radio lessons, film and television are closely linked, and teaching machines are the most recent addition to mechanical aids These, therefore, we have selected for consideration in the following pages

RADIO

The B B C has provided radio programmes for schools since 1924 These programmes are for children of various ages and last, in general, for some twenty minutes In order to give teachers in advance an idea of the geography syllabuses and content of the lessons, the B B C issues pamphlets which may be bought at low cost, these give excellent pictures, maps, and some written text The pamphlets thus provide a useful source of class material (page 73) The radio lesson is presented in a variety of ways It may be some form of play in which peoples of other lands are characterised, it may be an explorer describing the realities of his experiences, or the traveller giving first hand accounts of his journeys The approach may be that of the more direct lesson, with the class studying the material in the pamphlet The use of sound effects gives an additional reality not usual in school geography

There is little doubt that B B C lessons are of great value in a variety of situations, particularly in small rural schools where

numbers of staff are very limited and the B B C speakers offer fresh voices and different approaches They assist the non-specialist and stimulate the specialist Successful teaching depends upon variety and this broadcasting presents

There are some disadvantages The B B C lessons do not always coincide with time tabled lessons, so that the teacher may have ten or twenty minutes to fill in before the broadcast, or a similar period to fill up after it The former situation presents the greatest difficulties since the teacher has to use the time introducing the topic without reducing the impact and interest of the broadcast itself, yet is unaware of the exact detail which the broadcast is to provide The follow up period presents fewer difficulties, since the broadcast itself will offer many opportunities for recapitulation and revision It is essential that the broadcast material is reviewed and applied in some way, otherwise the children sit as passive listeners rather than as active participants in learning

The radio lesson offers no easy passage for the teacher He will need to follow the broadcast with great concentration, for he should write key words on the blackboard and perhaps point out locations on a wall map, at the same time planning his follow up The double process in his mind is concerned with ensuring that the class derives full benefit from the broadcast as it proceeds, at the same time selecting and arranging what he hears for representation and re emphasis at the end of the broadcast Older classes may be trained to take notes during the programme, even so, it is likely that the time after this will be spent in making some form of written record This record may take one of the forms earlier suggested, or may be a concluding paragraph using data not provided in the broadcast itself

Tape Recorders

The presence of tape recorders in many schools provides the enthusiast with a means of obviating the disadvantages of B B C live broadcasts If these are recorded on tape, they can be played to the class at the most suitable time, fitted in to the geography syllabus with accuracy The teacher can study the recording at his leisure, and frame his introductory work to lead naturally into the broadcast, which thus forms the main body and theme of his lesson, his conclusions can equally well be geared to all that has gone before He can frame questions which, when answered from what was broadcast, provide an orderly essay

He can devise notes with blanks to be filled, or ask questions orally, replaying parts of the tape not understood Foreknowledge of the content of the broadcast by the teacher enhances enormously the value of the broadcast to the child

An interesting extension of broadcasting is the development of what is called 'radio-vision' In geography the experiment began in the spring of 1964 with two programmes for thirteen- to fifteen year-olds It consists of showing a specially prepared film-strip in conjunction with a sound radio broadcast The broadcast is tape recorded by the school The apparatus can be used as and when required

Tape recorders, of course, have uses other than the conservation of live broadcasts One of the most important of these is the recorded interview This may be with some foreign visitor who has not been able to appear at school, or with a farmer or factory manager or port official met on some private or school excursion The skill of the questioner at such an interview determines the usefulness of the record for teaching purposes (page 106) If possible, questions should be thought out carefully before they are presented to extract the maximum amount of geographical fact from the interview If the school belongs to the British Ship Adoption Society there is the possibility that a visit to the ship in port might be put on tape through the courtesy of the captain, for the pleasure and instruction of the whole school It is also possible to tape lectures given by visiting geographers, such lectures thus being repeated on appropriate occasions

FILMS

It is difficult to realise that the first controlled experiment on the effect of films on geography teaching was carried out in 1919 by the Northampton branch of the Geographical Association Indeed Fairgrieve[1] wrote an article on this subject in 1917 In principle, there is little difference between the function of moving pictures and of still pictures in geography teaching In practice, the cine film plays a rather different role

It can show movement better than any other means short of actual demonstration, and much of the movement concerned in geography is human activity The farmer sowing his seed broad cast the old woman spinning at the cottage door, the operator of a dragline at an opencast working, are typical Physical pro cesses involving movement, such as the changing relationship of warm and cold fronts in a depression, and many processes of

erosion, are also well shown by three dimensional moving diagrams

In practice most films available for school purchase, hire or borrowing go further than this They frequently include panoramic sweeps of the countryside, or other forms of continuous scenic shots These, of course, cover a wider angle of vision than the still picture, and convey a greater impression of reality This moving picture cannot be discussed at the time, and it is essential that a school ciné projector should have a stopping device so that single frames can be considered in detail The best geography films have in effect developed a technique of offering the whole or much of the geography of the region, using typical scenes, typical activities, and a variety of moving diagrams and other devices

It is clear that the whole philosophy of this book is based on the importance of children actively studying material, and the moving film is one way of offering this There are differences in the means of study possible The method of stopping and con sidering a single frame tends to interrupt the flow of the film which is, very properly, designed as a complete unit or story This means that the teaching film should be short enough to be shown and then fully discussed in a classroom lesson An absolute maximum time for a 'lesson film' would be twenty minutes, and ten minutes is preferable Even in the short ten minute film, there is time for many separate sequences, and often far more content than children can reasonably absorb or retain It is at least arguable that the impressions given by the moving picture are less precise than by the still picture accurately studied

The geography teaching film which offers explanations to the children as it goes, in addition to exposition of fact, is, with certain exceptions, a denial of a major function of geography in education The mere absorption of fact and explanation offers little mental stimulation, and if the sound track of the film offers much explanation the children become mere recipients of pre digested thought The exceptions are mainly physical and mathematical processes, where a careful chain of logic must be followed In these cases, such as the movement of earth in relation to the sun, the expository film with moving diagrams may do the job better than all but the best teachers

Pre war attempts to compare the merits of sound and silent films in teaching were unscientific, and produced no results of statistical significance, since they were based on subjective opinion The development of sound films was no doubt

responsible for decline in production of silent teaching films, though many such films are now available, mute, for use on silent projectors The lack of research establishing the superiority of either silent or sound films in teaching led Craig[2] to investigate whether using mute 16 mm film with his own commentary would prove more effective than using the same film with sound track His experiment extended over 1954 and 1955 and made use of six short science films with a running time of between eight and eleven minutes His results are worthy of note here since the methods he used are relevant to the use of films in geography teaching He showed the first year pupils of a secondary modern school six films, once only, one film during each consecutive week, each class seeing three silent and three sound films The silent films were shown with an unscripted commentary adapted to the level of the class Immediately after seeing each film, and again four weeks later, the children answered a test paper In all cases, judging from the test scores, the silent film was remembered more effectively than the sound film The children themselves explained that it was difficult to watch the film and listen to the sound at the same time, that the teacher spoke more slowly and was easier to follow than the sound track speaker, indeed several backward children stated that they could not follow much of the sound commentary, so tended to ignore it Such an experiment strengthens the case for silent teaching films, using a commentary adapted to the needs of the class

In view of the length of a great number of films, it would seem that their main place in geography teaching is as background material, normally shown outside lesson time In addition to films designed for school use, there are many excellent quasi geographical films of exploration, modern economic development, and the like, which justify but rarely the allotment of a whole lesson Shown by the school Film or Geographical Society, they offer another useful link between geography in the classroom and the real world outside The cost of film production is high, and once a film is made it is often kept on the market despite the fact that much of the material within it may be out-of-date This lack of renewal of the subject matter of films presents another difficulty for the teacher, for he may need to amend the film by verbal correction where necessary For this reason, and for the optimum value to be gained from films, whether shown in the lesson or on other occasions the teacher needs to preview all films shown

TELEVISION

Since the second world war television has become increasingly accepted in schools as an instructional medium The teaching possibilities of television were investigated in an initial experiment in 1952 with six Middlesex schools using closed circuit television The success of this trial encouraged the B B C to ask other local education authorities to take part in an experiment on a larger scale This main experiment began in 1957 with twenty schools of representative types in London using television but in all other L E A's some three hundred schools had sets The programmes televised were 'Science and Life' (for ages 12 to 14 years), 'Living in the Commonwealth' (11 to 15 years), 'Spotlight' (i e Current Affairs, 13 to 15 years) and 'Young People at Work' (i e Careers, 14 to 15 years) Each lasted for twenty five minutes, with a telerecorded repeat, teachers' notes were available except for Current Affairs The Commonwealth programme was partially geographical The reports sent in by teachers were so encouraging that in 1959 the Schools Broadcasting Council of the United Kingdom made a request to the B B C that the television service for schools should be made permanent on an extended scale This led the B B C to issue a Decision [3] 'The B B C hopes that its decision to establish the first permanent nation wide service of School Television Broadcasts anywhere in the world, and to expand it at the earliest possible date, will be welcomed by all concerned with education The B B C is, like the Council, convinced of the educational value of television, and as these decisions show, accepts it as a responsibility resting on a national public service organisation to do all that it can to help the national service of education '

There appears to be little research directly connected with television and geography Nevertheless some of the more general research on television presents much of value to the geography teacher, and what is relevant is reviewed here Past experience, particularly that concerned with teachers acceptance of sound films, indicates that they are unlikely to accept any new instructional medium unless its ability to facilitate learning has been amply demonstrated Vernon,[4] using various groups of test population including sixth formers and adult W E A students, and differentiating between a series of talks and television programmes, on modern building and contemporary political and international affairs, found that to these audiences the television image 'enhanced the impressions of reality' It did not follow

that such features enabled them to understand and remember the content of the programme in general What was actually retained was determined to a great extent by the nature of the verbal material The presentation of visual material did not necessarily assist comprehension, this depended upon the simplicity and aptness of visual material and on the background knowledge and ability of the viewer

In 1957 MacLaine[5] investigated the contribution of home television viewing to the education of children He conducted an enquiry among teachers and reported that the majority favoured the use of television in the home Sixty per cent of the teachers he questioned suggested that such viewing was beneficial to children, though admitting that they themselves made but little direct use of what their children saw at home Seventy per cent of them favoured limited use of educational television in schools The teachers in small schools emphasised the advantages of such a service for isolated areas In 1958 other investigators[6] stated 'We should like to suggest that the child's viewing experiences be linked with teaching or discussion wherever feasible so as to bridge the gap between the teacher's and the child's world interests, and to utilise television as a means of getting children interested in certain topics This is particularly important with the younger children and the adolescent of average and below average intelligence'

It will be seen that opinion on the value of television is gradually crystallising into guarded appreciation of its potential as an instructional medium, the potential of which is not yet measured Theories of learning familiar to teachers stress that what people hear and see is always related to previous experience and will be interpreted in accordance with their previous body of knowledge In the learning situation, the greater the relevant experience in some field, the easier in general will be the learning of fresh material in that field, or in those closely allied to it In 1961 Trenaman[7] attempted a statistical assessment of the factors making for the effective communication of educative material He used similar material communicated in three ways, by the use of television, sound radio and print In tests of comprehension the television versions obtained slightly higher scores than the radio versions, and the latter were more effective than printed ones but the differences were not large enough to weigh heavily in favour of any one programme Previous knowledge of the subject of a programme or article was found to correlate with

comprehension at about 0 6, and knowledge gained from the programme, beyond what was already known, was even more closely associated with comprehension

There has been some insistence on the fact that television is to be seen as more than a combination of sound radio and the motion picture image The School Broadcasting Council reported[8] to the B B C in 1954 that 'opinion was unanimous that film and television were very different things the differences derived from the fact that television programmes, being broadcasts, are being produced continuously and being received by their viewers simultaneously with their production This differentiates their content and function from those of films' This report stressed the advantages of television in possessing immediacy, topicality and intimacy Gopsill,[9] in research devoted to television and films of geography, defined these terms Immediacy 'describes the condition which enables the viewer to see the programme simultaneously with its production', topicality refers to 'that element of a television broadcast which contains temporary or local interest persisting only for a short while', intimacy describes 'the quality of a broadcast which brings the viewer into closer relationship with the broadcast situation' The relative merits of television and films with particular reference to these qualities initiated his enquiries His test was carried out with four comparable second year classes, aged 12–13 years The conclusions of the investigation show immediacy and topicality as of little import, whilst the quality of intimacy, evident in both films and television, was paramount, depending on the nature of the screen situation as a whole In 1962 Mundy[10] compared television programmes with sound films as teaching aids Only some of the material selected was geographical, since his thesis was more concerned with the relative value of these two teaching techniques than with teaching geography to the secondary modern children taking part in the experiment He found no difference between these media in promoting learning

It would appear that the fact that television can immediately screen an event which owes its importance to the time at which it is taking place has less importance than was originally thought, particularly as such an event would probably be televised and repeated in normal programmes, not specifically for schools Claims that television gives intimate personal communication by showing the 'live' appearance of commentators are weakened since many television programmes contain much pre-prepared

film, or are recorded in their entirety for later transmission. It appears that as far as technical presentation is concerned, i.e. what the viewer sees, anything transmitted in the schools' television programme could equally well be done on film, and film can show colour not yet available on television.

If television is to be considered as a teaching aid, it is necessary to define the term. Teaching aids, static or moving, visual or aural, are produced as aids to teaching a specific part of the curriculum. The teacher selects them as they fit into his course; they are flexible in use and can be adapted to meet the needs of the class. The teacher uses the material in the process of learning as an integral part of the lesson. The Schools' Television programme does not indeed lay claim to being a teaching aid in these terms. The programme cannot be pre-viewed, or taped for repetition as required. Television is not under the teacher's control; indeed, it is tied rigidly to a scheduled time and neither its pace nor its content can be adapted to the needs of any specific class.

The producers of television programmes are clearly aware of all these limitations. Their programmes have been designed for a much narrower age-range and ability-range than radio programmes, so that the subject matter and vocabulary are in general within the capacity of viewing classes. As programmes which are packed with information become difficult to follow, thus losing the interest of viewers, the number of points made is limited, and explanations are careful. Experienced teachers devise the programmes, and notes are provided well before the beginning of each term's viewing. They often contain suggestions on how to prepare a class for the viewing, together with ideas for advantageous follow up. It is apparent that the success of the televised programme depends on the ability of those preparing it. Schools are asked to report after programmes, but since these reports are submitted after the broadcasts, they can be of help only in future planning.

If the disadvantages of using television are similar to, but perhaps greater than, those of using radio, does it have compensating advantages? It presents a form of variety in teaching. It often presents information in a way not open to teachers. Although the teacher may not always agree with what is presented, he may find much of which he approves. A fresh approach to the subject may also be stimulating to him. Teachers who have used television geography programmes with their classes

invariably comment that they encourage spontaneous discussion among the children The B B C has record on tape of such discussion in an Essex school for the educationally sub normal The sharing of the common experience of viewing apparently makes children eager to report what they have seen It is probable that in the initial stages the novelty appeal of television is effective in motivating the learning efforts of children, familiarity would weaken this effectiveness

The teams of geography production experts on both B B C and I T A channels maintain close contact with schools, and make every effort to offer topics of value in school geography The number of geography programmes is naturally limited, for there are many other subjects to be televised Indeed, often these other subjects include much which is geographical in their content In geography, telecasts have taken the child to the farm, the factory, the fishing port, the market town They have added reality to physical geography by the study of rivers, of weather, of various landforms and landscapes Programmes on regional geography extend over a wide range of countries, and accent both 'international affairs geography' and 'way of life geography (page 12) In *this way television may have some contribution* to make towards international understanding

'Most notably television has the power to widen and deepen experience It can take its audience out of their classroom into every country and every century It can bring into their classroom interesting people of all kinds from the world outside for it opens on places beyond the range of any school visit '[11] For the geography teacher this is encouraging There are those who feel that programmes have not yet reached their optimum, but concede that television for schools is still in relative infancy The declared aim of the television sponsors is to stimulate *interest, to provide a springboard for further activities, and to* provide enrichment in class subjects In 1964 there were over two thousand sets in the primary schools of England and Wales registered with the B B C as viewing schools, nearly fifteen hundred in secondary modern schools, and nearly eight hundred in grammar schools This expansion has taken place in little more than a decade since the initial experiment of the B B C in six schools, such an expansion *may in itself indicate the success* of school television broadcasts

CLOSED CIRCUIT TELEVISION

The cost of closed circuit television is high, so that it must be for general use in schools, not only for geography lessons In this time of shortage of teachers it is seen as a possible replacement device, and enthusiasts believe that televised lessons may well be more successful than normal classroom lessons The main advantage of these television lessons over the open circuit broadcasts of the B B C and I T A is that they can be geared to the interests and needs of the children directly concerned, and are given by teachers who are known to them

There are a variety of types of closed circuit installations First, that on a large scale serving an area the size of a large town or city At present there is only one of these in operation, in Glasgow, but a number of other education authorities includ ing Inner London and Liverpool are considering installations At Kingston upon Hull a new comprehensive school has been provided with a television studio to which all other schools in the Authority's area are wired Second is the smaller scale experiment such as that in Hampshire, where Southern Television has provided a school studio to which two schools of different types are connected The third type is the one in which both production and viewing take place in the same school Usually it is necessary to have a room which becomes the television studio, but at the Burnham Grammar School in Buckinghamshire the teacher gives a normal lesson to one class which he televises himself, and this is transmitted to a second class in an adjacent room In this category lies the scheme in progress at Kidbrooke Comprehensive School where the London County Council initiated an experiment to assess the success of such television teaching The equipment here consists of two cameras with monitor sets, a sound system, extra lighting and receiving sets Seven classrooms are wired for receiving, so that some two hundred children could view the programme, but when a direct teaching lesson has been given, it was found necessary to limit the audience to three forms of comparable ability

Mills, who is responsible for this research in geography, summarises the advantages of closed circuit television as follows [12] Geography is a subject in which visual illustration plays a large part, so that television, being a visual medium, is very suitable for geography teaching The teacher can make use of a great variety of pictures, diagrams, animated diagrams and models

These may be magnified, if necessary, so that they fill the screen, on which children tend to concentrate intently Maps stand out particularly clearly Investigation has shown that retention of map work by viewing classes is higher than that from classes having the same map work taught in a normal classroom lesson Lessons given tend to be very effective because they must be so thoroughly prepared Team teaching is possible, each teacher contributing lessons on subjects in which he is particularly interested Preliminary investigations show that the lessons are of interest to children, although the initial impact is not maintained The lessons also appear to be effective in assisting the learning process Mills considers the main disadvantages to be less numerous but nevertheless severe Each lesson, of which televising may only form a twenty minute section, takes from three to nine hours' preparation, and this time is only justifiable if a large number of children receive the lesson It was found that teaching a class before the camera with other classes watching the screen was less successful than the teacher presenting the lesson on his own from the studio, the classes viewing answering questions with the aid of a speak back microphone This means that the televising teacher is divorced from the classes, and cannot see the reaction of his viewers Speak-back answering with a portable microphone takes time and tends to slow down the televising, thus questions need to be reduced to a minimum This in itself reduces class participation, and care must be taken that the televisor is not merely telling the children rather than teaching them The teacher televising must be sufficiently experienced to judge accurately the time which will be taken by pupils to read a paragraph in a text book, find a location on an atlas map, or work out an exercise Closed circuit television lessons do not necessarily replace teachers, for it is customary to have a teacher in charge of each form viewing to provide help necessary during the television, to assist the children in follow up work, and for class control It is essential for the television teacher to discuss thoroughly the lesson with the teachers who are in the classroom with the children The interchange of ideas which follows is one of the most important side benefits which have accrued from the experiment

Although this experiment in closed circuit television lessons is a long term one of which only part has been completed, it would appear that such lessons are most likely to be successful when used as a form of variety in teaching rather than as a permanent

replacement of normal classes Follow up work is essential if the teaching is to be effective It is clear that the success of such lessons, like that of all teaching, depends on the quality of the teaching, and thus of the teacher However, no final assessment of the value of closed circuit television teaching in geography is yet possible

PROGRAMMED LEARNING

The expression teaching machine is less used today, perhaps because it implies a mechanical element in education abhorrent to those concerned with the development of individuals Programmed learning covers a wider field In this country, geographical teaching programmes which have appeared take the form of programmed text books, based on the same ideas

Although some work on programmed instruction appeared in the U S.A as early as the 1920's, it was not until some forty years later that interest in this aid to education became widespread in that country 1960 saw the publication of many books on the subject, among them *The Art of Auto Instructional Programming* and *A Programmed Primer of Programming*, both by Eiger and published by the Center for Programmed Instruction in New York In April 1961 Saveland s *Program of Earth-Sun Relations* was made available in an experimental edition published by Ginn and Company, Boston, and this appears to be the first geography programme of its kind Thus the initial impetus in programmed learning in our country has come from the U S A., and as yet there are very few geography programmes available

The idea of programmed learning is based on the principle that the student learns by being active, and that he is more likely to learn the responses that he practises It is also thought that learners are more highly motivated if they know immediately whether their responses have been correct or not The teacher who gives, corrects and returns written work promptly is well aware of these points In programmed learning, therefore, the exercises are devised on the familiar teaching process of starting with something known to the pupil, and leading him by short, logically related steps to the unknown These steps are simple, so that the reader is likely to make correct responses, and therefore practises these rather than incorrect ones He is told, as soon as he makes a response, whether he is correct or incorrect Thus the function of the programme is threefold, it

presents material, it requires some response, and then produces a 'feed-back' adapted to the response made

It will be seen that this is not a new idea, the teacher performs this function in the normal oral or written work of the class lesson The question asked in class is normally one which can be answered by the children, few teachers would find it profitable to present questions which the class could not answer If a wrong answer is given, the teacher deals with the mistake on the spot In some programmes a wrong answer means that the work must be repeated until the right answer is given In others, the programme deviser makes allowances for wrong answers, and the feed back reveals not only the correct answer, but explains why a wrong answer is incorrect

Most programmes so far compiled may be classified according to the type of response they call for In one type, the answers are selected from a series of multiple choice answers (page 356) If the response is correct, the next step tells the pupil why his choice is right, if incorrect, the pupil is sent, or 'branches', to an explanation of why the response is wrong He may then be led through a series of remedial steps which form a revision of the original material This type of instruction is known as the intrinsic or branch type Constructed response programmes, on the other hand, are devised in the belief that they provide the particular sequence of steps which will lead to correct responses, with a minimum of errors likely along the way The pupil creates his responses instead of selecting them from a set of options This type of response is one of recall rather than of simple recognition These programmes are of linear type The branch type of pro gramme would appear to be more difficult to devise, since the writer must be ready to foresee, explain and devise exercises to correct errors, the linear tries to foresee and avoid them

Branch programmes are open to the criticism valid of all multiple choice questions, that such choices always contain wrong responses and thus may strengthen undesirable ideas Some of the explanations of errors given are adult explanations which may serve only to confuse the child further Indeed, most teachers are aware that children give wrong answers not always because they have thought incorrectly but because they have not stopped to think at all Linear programmes can be criticised because they require only one word answers This denies the child the opportunity of writing a complete sentence, or a series of linked sentences such as are essential for fluent speech or essay

writing Writing and recording in class are undertaken to reinforce learning, this stimulus is missing in programmed learning

The major advantage claimed for programmed learning is not that it increases the rate of learning, but that it allows each pupil to learn at his own pace When the programme exercise is correctly worked the reader moves by his own unaided effort to the next progressive exercise This is seen as a major incentive to achievement, and the completion of exercises is sometimes marked by the phrase 'Well done', or 'Good work', or 'Full marks' Every pupil eventually obtains full marks for each section, whether or not at the first attempt The slow student can work at his own pace, he is freed from the confusion of material presented too rapidly

Other claims appear specious rather than valid One book claims that the system 'removes all the unnecessary drudgery from classroom instruction and allows the teacher time and energy to get down to personal tuition of individual pupils Pupils can work at their own speeds, going—when in difficulty or when called—to the subject tutor, as to a tutor in the university' The same writer claims, in the next sentence 'The teacher need not necessarily be in the classroom when the pupils are studying his subject' He also states 'Here is the answer to the time waste of marking the award of work marks, always invidious, becomes superfluous' In this book, indeed, there is no marking There is no writing, save for the noting of four numbers at the end of each section Not all teachers would regard marking as waste of time

It is significant that the first programmed learning book[13] in this country known to the authors is concerned with mathematical geography Mathematical geography lends itself readily to understanding by means of short, logical steps The follow-on book is a programme on climates It would be a pity if the essential synthesis of our subject were lost by its breakdown into the programmed learning of isolated aspects The lack of programmes on regional geography may be indicative of the difficulty found in analysis of the subject for programming, the only regional programmes so far attempted have lost the personality of the regions concerned in a mass of short, factual responses reminiscent of a return to 'capes and bays' rather than of geography It is evident that the quality of the geography to be learnt depends entirely on the skill of the programmer

Before programmed learning is accepted whole-heartedly in this country there is need to discover whether children do, in fact, learn from programmes, and whether they retain their knowledge There is also need to find out whether such programmes appeal to children, whether their impact is only temporary, whether they lend themselves to the teaching of all subjects, and whether they are more successful with less able or bright children There are at present major research projects on programmed learning in progress Until their results are known we must be sceptical

The Overhead Projector

The overhead projector is a short focal length projector for use in daylight or artificial light In essence it consists of a box in which is housed a light source, the light from this being con densed into a lens assembly above the light box and reflected through an angle of 90° on to a screen or light coloured wall On top of the box is a sheet of strong glass which acts as the working surface of the projector A small almost noiseless fan keeps this working surface cool Most projectors are fitted with a twenty five- to fifty foot roll of translucent material, acetate, mounted so that it can be drawn across the working surface by turning a roller A map, diagram or written passage prepared on the acetate can thus be brought into view when required, or the acetate may be drawn on while the lesson is in progress, so that the projector is used as a substitute for the blackboard Individual acetate transparencies can be prepared before a lesson, fixed into a cardboard mount to prevent curling, and fitted on to the working surface By overlaying such trans parencies may be used to build up a series of steps, e g in map construction or field sketching or to show relationships, e g a population map placed over a relief map For permanent records it may be advisable to use special inks which etch into the acetate, whilst transparent plain striped or stippled adhesive material can enhance the standard of production, but for most teachers a few special coloured pencils and a special pen will suffice

The overhead projector can be transported without difficulty or used as a fixture The teacher uses the projector whilst facing his class, so that pupil activity can be initiated or maintained easily It can be used in conjunction with a blackboard or to replace it The teacher has the same view of the image as his pupils It is not necessary for him to turn to the screen The

projector is a new and flexible instrument which is of particular use to the geographer in that it can demonstrate relationships by showing two or more sets of data on the same base

In addition to these mechanical aids, it is clear that geography teaching uses a great deal of equipment—maps, pictures, books and specimens There have been implications about their importance throughout the book They will be housed in the geography room or the geography laboratory The struggle for the establishment of such rooms was won long ago,[14] and there are many articles[15] which discuss their ideal layout The really vital items of such a room appear to us to be a large blackboard, plenty of display board, and a screen The geography room is nevertheless in a way the chief mechanical aid, and houses the equipment needed Most modern geography rooms have an adjacent store room for projectors and like material The main function of the geography room is to create atmosphere. Geography must *happen* therein, on the screen, on the walls, and on the blackboard, but particularly in the minds of the occupants.

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14 Geography Room Survey, 1957 Report by the Secondary Schools Section *Geography*, Vol XLII, November 1957, pp 238–243

15 e g Heaton, P R *The Geography Room in a Secondary School* Geographical Association, 1954

CHAPTER 19

CONCLUSION. REALITY IN GEOGRAPHY

In the preceding chapters we have not found it possible to cover the whole of geography Our view of the syllabus has been made clear There should be modest cover of the world by continents, with some generalisations about world patterns, in a five-year course In the sixth a deeper understanding of the nature of the subject, and of its component specialisms, will be encountered We have not considered every specialist branch of the subject Oceanography, historical geography, economic geography have scarcely been mentioned, though their existence has been implied Children may or may not hear of some part of their subject matter—though not as specialisms—according to the taste and interest of the teacher

Bio geography and vegetational studies have received scant attention, though the manner of approach has been clearly implied Factual knowledge should come first, and a knowledge of world vegetation regions later This is a specialism in which there is recently growing interest, and new knowledge has not yet reached school texts We would mention only one point It is easy to confuse climatic and vegetational regions, and the expression natural regions has helped to obscure this issue For this reason we have almost entirely avoided the words natural region Although this was a concept which advanced the development of our subject, its practical application is something which often has to be unlearned by children Indeed, children can have two parallel and conflicting ideas in their minds at the same time They will happily shade in on a map large areas of western Europe as having a vegetation of broadleaved forest, and later write excellent essays on the distribution of grass or industry. Java, China, the eastern U S A., indeed, any densely settled area, provides a similar example The relationship of climate and vegetation is one not yet fully understood, and we should be cautious in what factual statements are made to children For the moment both accuracy and clear thinking are helped if the

two are kept separate Climatic regions should be named in terms of climate, vegetation ones in terms of vegetation The extent to which the two world distribution patterns coincide is a matter to be treated with great care

Our syllabus may be overcrowded For the harassed teacher, we would suggest the omission of items rather than cramming to include them Omit, and omit again It is better to have made four thorough studies in Africa and to have heard of the continent than to give a dozen cram lessons to include every region The whole theme of this work is that geography is real, and real geography is lost if the teacher is concerned only with summaries of fact

The geographer is he who has the habit of observing a landscape This capacity to observe is a knack of awareness, and a function of this awareness lies in seeing real examples Once the teacher has acquired the knack he sees geographical material on all sides This seeing right material makes his lessons live, it is part of the expertise of the experienced teacher He weaves into his regional work items which illuminate the body of facts and it is these items which help build up his pictures of the geography of our own and other lands The core of this chapter is the presentation of such items, real examples of particular geographical points, interesting to children, which build towards the reality we seek

Let us start with a simple example It is normal in teaching to give children some idea of what is meant by the rotation of crops, and the four year rotation of Norfolk is a common example This particular rotation is seldom found nowadays but the principle of crop rotation still exists Instead of the customary drawing of four blocks of four squares representing fields we suggest the repetition of a simple landscape diagram (Fig 53) It takes little longer to draw the landscape than to rule and measure squares

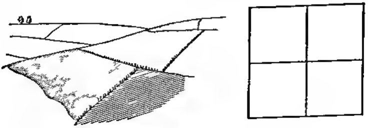


Fig 53 Suggested way of showing four year rotation

If the diagrams are coloured naturally, an even greater impression of reality is given

The cross Channel timetables issued by British Railways provide the basis for an introductory lesson to France Using the timetables the class can map the packet ports of England and France, they discover the times taken by various routes, and the expansion for summer traffic in the frequency of sailings In these days of travel such a lesson has practical value Information about imports and exports, commonly derived from *The Statesman's Yearbook*, often comes most happily in the form of a ship's loading schedule, be it that of a tramp steamer calling from port to port, or that of a particular ship on a recognised route such as that shown below

MEMORANDUM

Freight Department

ROYAL MAIL LINES LIMITED

River Plate & Brazil Service

SUMMARY OF CARGO LOADED

HIGHLAND MONARCH Discharge LONDON

Cargo from

	Tons weight		Tons weight
BUENOS AIRES		MONTEVEDIO (contd)	
Meat, Chilled	1,238	Wool, Greasy	50
Meat, Frozen	857	Wool, Tops	20
Meat, Frozen Horsemeat	25		
Meat, Canned	134	SANTOS	
Poultry, Frozen	89	Bananas	380
Wool, Greasy	20	Oranges	560
Skins, Lamb and Sheep	27	Sassafraz Oil	8
Pollards (Bran)	880	Peppermint Oil	10
		Menthol Crystals	6
MONTEVIDEO		Coffee	250
Meat, Frozen	119	Cocoa Butter	20
Meat, Canned	24		
Poultry, Frozen	16	RIO DE JANEIRO	
Rice	75	Coffee	110
Sheepskins	15	Meat, Canned	150

RIO DE JANEIRO (contd)	
Rock Crystals	16
Carnauba Wax	18
LAS PALMAS	
Tomatoes	166
Potatoes	48
LISBON	
Sardines	22
VIGO	
Fish, Preserved	36
Fish, Frozen	27
	5 416

Exercises suitable for second forms could be as follows

(1) Find the total weight of goods in the cargo which cannot be eaten or drunk What percentage is this of the total weight of the cargo?

(2) Attempt to classify the items of the cargo into groups such as food, drink, minerals, etc Which group has the greatest tonnage?

(3) One important cattle product which is exported from Argentina is not included in the *Highland Monarch*'s cargo Name it

This type of information can be obtained from any main shipping line Passenger-carrying companies often supply other useful travel data

Many teachers use the Port of London Authority map and filmstrip when teaching about docks in London, but reality can be given to port studies elsewhere when opportunity arises The diagram of St Andrew's Dock, Hull (Fig 54), offers an example, particularly if it is also noted that Hull is the base of 141 deep sea trawlers, that is sixty per cent of the United Kingdom fleet, and that one third of the British catch is landed here Some detail of history may give life to a port study The map (Fig 55) shows the location of the old sandbar which a report of the East India Company in 1685 mentions as preventing ships from entering the sheltered

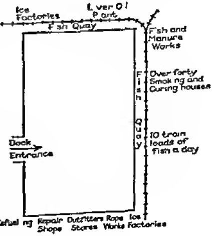


Fig 54 St Andrew's Dock, Hull

waters of the bay. Indeed, the settlers who first inhabited Durban and erected primitive houses were unfortunate seamen whose ships were wrecked in attempting to cross the bar at high tide. Even in the nineteenth century one could walk across from the Bluff to the Point at the expense of wet feet. Not until 1851 was a serious attempt made to clear the bar away, and it did not disappear until 1898 after four years of sand-pump dredging. Now, with continual dredging inside and outside Durban Harbour, ships with a draft of thirty-eight feet can enter irrespective of the tide, and the harbour is the busiest and largest port in South Africa. A further idea for port study is given on page 415.

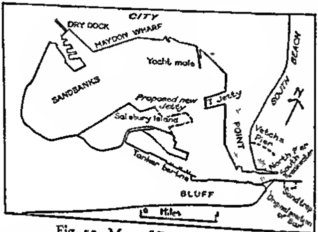


Fig. 55. Map of Durban Harbour.

We have mentioned the use of statistics, particularly for comparisons of production, but they can be used for impact. Of the total world land surface of some fifty-six million square miles, approximately one-fifth is too mountainous or at high elevations, one-fifth is too cold, one-fifth is too dry, and one-tenth has inadequate soils for cultivation. Such a statement as an introduction to a lesson dealing with population problems arrests the attention. A little arithmetic shows this to be seventy per cent of the land surface. This means that approximately thirty per cent only has relief, soil, rainfall and temperature suitable for cultivation. Further emphasis can be given in terms such as that North America and Europe, including U.S.S.R., have one-quarter of the world's population and three-quarters of the world's food; the other continents have three-quarters of the population and one-quarter of the food. A world outline map, with a diagonal

line separating the haves from the have nots and the population figures of the major areas added, gives force to these pronouncements A simple survey by the children of the numbers of people who live in their own street or village may give some help towards realisation of the numbers involved

A recent television programme showed a prize winning Swedish film, the story of a year on a small island in the Baltic Sea some thirty five miles east of Stockholm Its excellent photography revealed the gradual freezing of the sea during November, and the island inhabitants pulling their sledge across the frozen Baltic on a shopping expedition to a neighbouring larger island Boys found sport in motor cycling on the sea At Easter the sea was still frozen, but warm air from the south brought back the

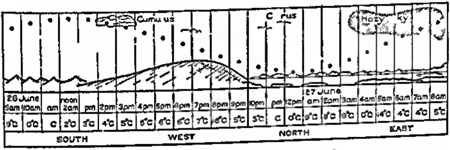


Fig 56 Panorama showing the midnight sun

eider duck, the sea eagles and the gulls heard but not seen in the fogs created by the same warm air Spring sunshine and higher temperatures caused the noisy break up of the sea ice and the melting of winter's snows, trees and wild flowers blossomed In summer meals were eaten out of doors, and long hours of day light made sleeping difficult The panoramic picture showing the varying elevations of the midnight sun here reproduced from a tourist postcard (Fig 56) is a further piece of reality which could be used to link the seasonal picture just described with the study of earth movements discussed in chapter 10

Travellers' tales, and travel itself, are a rich source of detail The following all refer to climate In a Maltese house the stone floors are carpeted from November to March, rugs and carpets are removed for coolness during the rest of the year In Spain dinner is served from nine thirty p m , the afternoon siesta, followed by work, pushes social life into the late evening when temperatures are lower In a tropical rainstorm one can get soaked to the skin running from one building to the next, but

the rain is not cold, and wet feet splashing through puddles are not chilled as in English rain It is sometimes thought by children that the native inhabitants of tropical lands feel no discomfort from the climate, because as they are born in the area they are somehow immune to heat In April temperatures of 95° F in the shade—and 105° F in the sun—in Accra, beads of perspiration drip from the Ghanaians, as well as from English visitors, and five showers a day seem necessary for relative comfort, even when much time is spent in air conditioned rooms A thermos jug of iced water stands in each hotel bedroom The effort of writing makes the hands wet, and blotting paper is necessary, not for ink, but for perspiration Some teachers are familiar with the sight of mahogany coloured skiers on snow slopes in brilliant sunshine We ourselves recollect idly examining long icicles hanging from a nearby roof only to find that within minutes a bar of chocolate placed ill advisedly on a wooden terrace table was dripping on to the floor In Winnipeg the impact of centrally heated air with cold air at a front door opened to receive visitors, causes a patch of fog Many travellers who have crossed the Alps in March or April have experienced the excitement of leaving a Christmas scene of falling snow at the northern entrance to a trans alpine tunnel and coming out into the brilliant sunshine, fruit blossom and flowers of the southern valleys

Many teachers nowadays have a considerable fund of direct experience, such as the above, gained from their own travel Few geographers are not travellers Holiday tourism merges almost indistinguishably into geographical field work Both are productive of vivid first hand detail for later use, perhaps the latter collects it in a more formal way The popularity of summer schools, at home and abroad, witnesses the interest of geographers in both The miscellaneous bric a brac they acquire in addition to the formal record and the photograph, provides further material for the geography room

Another problem in teaching geography lies in how to help children understand scale This understanding involves not only the ability to deal with the mechanical manipulation of scale on maps, but true realisation of size To this end it is useful sometimes to consider distance in terms of time A sea journey to Australia, thought of in terms of beginning at the end of the summer term and concluding in time for the start of school in the autumn term, is easier for children to comprehend than the sole mention of a figure such as twelve thousand miles, which

they cannot imagine Similarly, the following timetable of the Trans-Siberian Railway gives a most real impression of distance A great deal of information about the railway itself is available in *To the Great Ocean*, by Harmon Tupper (Secker and Warburg, 1965)

Moscow	Friday	13 55*		0 miles
Kirov	Saturday	6 46*		596
Sverdlovsk	Saturday	23 29	+2	1,130
Omsk	Sunday	13 07	+2	1 688
Novosibirsk	Sunday	22 09	+3	2 077
Krasnoyarsk	Monday	12 10	+4	2 552
Irkutsk	Tuesday	8 58	+4	3 227
Ulan Ude	Tuesday	18 56	+5	3 532
Chita	Wednesday	6 18	+5	3 877
Karinskoye	Wednesday	8 22	+5	3 938
Skovorodino	Friday	5 28	+6	4 466
Khabarovsk	Saturday	5 48	+6	5 322
Vladivostok	Saturday	20 30	+6	5 880

(* Moscow Time others local time)
(+2 = hours in advance of Moscow Time)

The size of mountains as barriers to communication can sometimes be emphasised by detail of a tunnel For example, the Simplon is a double tunnel, the first was begun in 1898 and was used for a single line in 1906 The second tunnel, some fifty yards from the first, runs parallel to it and has communicating galleries This was not finished until 1922 During construction vast quantities of scalding water flowed from the borings in almost uncontrollable volume and threatened to make further progress impossible, and work from the Swiss end was abandoned Finally the engineers completed the penetration of the twelve and a half miles of rock The tunnel is entered at about one mile from Brig, in the tunnel huge electric fans work day and night to keep the air fresh, and heavy iron framed curtains, automatically raised by the approaching train and lowered after its passage, regulate the ventilation The south end of the tunnel is at Iselle the railway then leads to Domodossola These places could be located on an atlas map, and the distance of twelve and a half miles should be compared with a similar distance known to the children

Realisation of size is assisted by drawing to correct scale whenever possible No section with a vertical exaggeration of more

than five times should be permitted, even with the lower forms, and less exaggeration is desirable The popular section of a rift valley is particularly misleading, and the use of a large scale map for measurement of a section across the Rhine rift or the East African rift valley (Fig 57) assures greater reality Another section drawn in school geography is that across the eastern Paris basin This is frequently presented as a sketch section without indication of height The map (Fig 58) suggests a line for the section, which enables it to be drawn to scale Although the

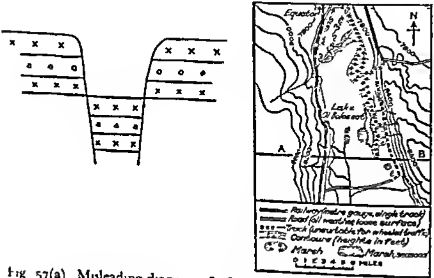


Fig 57(a) Misleading diagram of rift valley
(b) Map for drawing accurate section across the East African rift valley

dip of the underlying rocks is not given, these can be inserted with the probability of less exaggeration than would be the case if the section itself was inaccurate

We have already made mention of the value of descriptive passages (page 110) and have indicated their use in the production of seasonal charts The seasonal chart can sometimes be devised by the teacher himself from material discovered in the course of his reading, and can be used in class to provide data the detail of which is convincingly real Such a chart is shown in Fig 59 The descriptive passage can be used by the class in many ways The following passage by F Spencer Chapman from *The Jungle is Neutral* (Chatto and Windus) is sufficiently detailed

to offer a vivid picture The text can be analysed to discover the information it presents Four regional divisions can be found paddy lands, plantations, and two types of forest A cross section of such a journey lends itself to pictorial expression

> Our way soon left the paddy fields, and after crossing a narrow strip of jungle we quickly reached the open trees of a rubber estate It was very noticeable that these small patches of jungle, where plenty of light could enter from the sides, were very much thicker than the big jungle where the ceiling of greenery shut out the sunlight and fresh air In these patches rattans and other thorns flourished, and the palms, ferns, bracken and seedling trees rose in such a mad scramble towards the open space above and all round them that, away from the path, progress was impossible unless one hacked a way through with a jungle knife We spent some time trying to work our way westward, but the palm-oil and rubber plantations soon stopped and there seemed to be no track through the jungle By the middle of the day the atmosphere was exactly like that of the Orchid House at Kew Gardens, except that not only did the heat seem to rise up and strike us from the ground, but a burning sun shone mercilessly everywhere but in the thick jungle Our clothes were soaked with sweat which, in that already saturated air, could not evaporate, and we were tortured with thirst.

It is clear that literature has a place in geographical study Good writing can enrich knowledge, particularly regional knowledge The literary view of a landscape is the artist's view, and the artist, of course, selects from the material what he feels to be important to him If he is an artist of any quality his inspiration will be of value for the common man, he adds imagination to mere imagery There is a close parallel with descriptions in the best prose The writer's ability to stress what is significant to him is akin to the imaginative selection the teacher should bring to any place he studies We venture to suggest that if he has not visited a place personally, his knowledge or understanding of it is incomplete without the reading of some sort of additional matter to enrich it Some writing gives false impressions, the notorious errors of *Swiss Family Robinson* are an example The good regional novelist, however, is not really drawing on an imaginary background He is selecting from what he knows, and place names are sometimes real, sometimes thinly disguised The geographer should be aware of the authenticity of the writing from his own knowledge Traveller's tales are a well known source, seldom to be classed as great literature, they nevertheless

create an impression of reality by means of detail Indeed, much of what is relevant to our needs is not great literature, but is to be found in the leisure reading of a novel We quote one such passage here taken from *Nightingale at Noon*, by Margaret Summerton (Hodder and Stoughton, 1963)

Beyond the blind stone walls and gaunt flanks of Mas Samphire, the farmstead, the herds of jet black bulls cropped the harsh salt flats under the guardianship of cattlemen flourishing cruel pronged tridents from the backs of plunging white horses Occasionally at sundown, flights of rosy flamingoes winged in pink arrowheads to wade and sup in the marshy étangs Nightingales sang ceaselessly by day

The Camargue in June, a scorched, a primitive, a battling land, at the edges of which it intrigues tourists to nibble, riding the flat wastes tricked out like Wild West cowboys, or thronging on Sunday afternoons to stare, hot eyed, while bulls and matadors vie to flout death in arenas the Romans built

At the junction of the farm track and the main road, I looked back through the raggy windbreak of cypress and poplar at the tough, black walls, empty of windows on this side, that was the direction from which the Mistral blew, and the farm builders of a hundred years ago had sought protection from its ferocious spite by turning their backs upon it

Dazed by the white-hot sun that blazed from the colour drained bowl of the sky, my eyes crossed the road to the rice paddies, where a straight row of casual workers from Spain bent knee-deep in mud setting out the young plants in symmetrical rows Land and water, rice and grazing That was the battle that waged over the body of the Camargue Week by week the rice paddies with their attendant bulldozers, their monster drainage pipes spread out, stealing and taming the salt marshes of the cattlemen

I lingered outside until the sky was drained of its last streak of colour, telling myself I could smell the sea, but it was a delusion fostered by the salty étangs that dotted the marshes By day when they borrowed their colour from the sky, they were a pretty, innocent blue By night they had the cruel glint of steel, and you remembered the tales of the treacherous sand bogs on their fringes that would suck you up to your knee in the turn of a second perhaps never let you go

On Sunday morning the Mistral struck It funnelled down the Rhone valley to spread itself over the Camargue in a tumult of rage that thrashed the scattered bushes and sent every reed every blade of vegetation into battle against its neighbour The harp shaped étang that marked the first salt flats was crested with

a thousand tiny waves, few birds launched themselves against the wind, no nightingale sang, and inside the mas every window was fastened as tight as sagging latches permitted Outside it buffetted us mercilessly, billowed our skirts, raised storms of yellow dust and flung them spitefully in our faces We were in an empty world, with none of the tourist riders who, especially at weekends, travelled in strings between the étangs There were no bird watchers, either, scanning the horizon for hawks and flamingoes, just the giant wind from the mountains, and over to our far left the black bulls which tossed their heads fretfully and occasionally galloped, tails upraised, tufts awhirl in the wind

Indeed, many detective and adventure stories contribute to our store of geographical detail Few who have read Arthur Upfield's stories of the Australian outback can have failed to capture its atmosphere, unfolded in revealing phrases everywhere

> It was now late April, and the beginning of a period in the autumn when, in this western section of the Interior, the air is still The summer heat has passed, and the willy willies no longer dance over the landscape, arid and brittle.

Or

> The breakaway was the granite lip of a vast and shallow saucer, on which grew a mulga forest the like of which is exceedingly rare in modern Australia, where steel axes have been frantically wielded for more than a century The limits of the forest in the saucer could be seen, the entire area difficult to guess Outside the saucer, on higher ground, there grew only the sparse jam tree, the waitabit bush, and the spinifex, patched by large areas of surface rock, and larger areas of salmon pink sand

Our final extract comes from a different author

> B—— had done his homework on the 1 50,000 Overseas Survey map and knew exactly the route the little cane line took First there would be five miles of the cane fields between whose high green walls they were now travelling Then came Middle River, followed by the vast expanse of swamplands, now being slowly reclaimed, but still shown on the map as 'The Great Morass' Then would come Orange River leading into Orange Bay and then more sugar and mixed forest and agricultural small holdings until they came to the little hamlet of Green Island at the head of the excellent anchorage of Green Island Harbour

The B—— in question is none other than the famous 007, James Bond. For teachers interested in such fare, *The Man with*

the Golden Gun (Jonathan Cape, 1965) has other indications of Jamaican atmosphere.

The teacher's reading will encompass geographical magazines and the journals issued by innumerable firms and foreign governments. The existence of such journals is discovered almost accidentally, through contact with other teachers, through the doctor's waiting-room, the hotel lounge, a visit to a friend's house, and the willing assistance of relatives at home and overseas. A letter to government offices written on school notepaper ensures a regular supply of up-to-date information. The journal of the Danish Foreign Office, for example, is issued free monthly, and

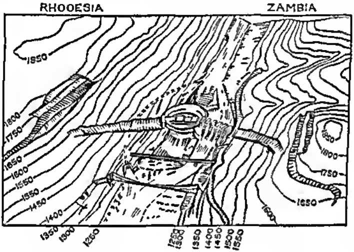


Fig 60. Site of the Kariba Dam

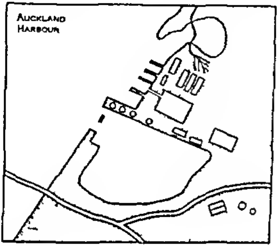
not only gives detail of Danish agriculture but keeps in perspective Danish industry, an aspect of Danish geography which tends to be neglected. Class analysis of the advertisements shows clearly her pre-eminence in the field of dairying equipment, amongst other manufactures. The map (Fig. 60) appeared in a journal free from the Federation of Rhodesia and Nyasaland, and the exercise of drawing an accurate section across it in line with the Kariba dam makes the project a more real one for children. We have on hand the June 1965 issue of *Report from South Africa*, specially devoted to the Orange River project, which includes photographs and four maps giving detail of the dams and weirs, the pipelines, tunnels and canals, the hydro-electric schemes, and the irrigation areas proposed. Such detail

is beyond the needs even of sixth formers, but can be simplified The Orange River itself, from its beginning as a vigorous, constant stream fed by melting snows and an annual rainfall of forty inches, to the long stretch where no perennial rivers feed it, and where it roars through the 480 foot deep canyon of the Augrabies Falls, is described so vividly that it becomes a real river Pictures, map and text present the landscape and its problems, this material is not yet in the text books, it is real geography in the process of happening The living geography to be culled from such sources is exciting Like the news of the birth of a new island rising from the sea bed, it has impact

The use of models is advocated by enthusiasts as an aid to reality in teaching We find ourselves unconvinced There is no doubt a place for the working model of the coal mine or the water wheel or turbine No one who has experienced the thrill of pushing a button to start a model working would doubt that models attract and can be instructive The provision of relief models of the school area or of an area known to the children may assist their appreciation of reality, but it seems likely that the children recollect the model rather than the real landscape The making of Zulu kraals or Eskimo igloos by less able children can produce results disappointing to the children concerned If such modelling stimulates their interest, the time is not wasted There are books available giving detailed instructions on model making, we leave these to the teacher skilled in handcraft In general we would leave model making to juniors, whose lively imagination carries them beyond any lack of reality in the models they achieve

Our search for reality extends beyond books, charts and models There is much geography to be found in the appropriate museums, from the folk lore museums of foreign lands to those of our own country The outstanding examples of museums most valuable to the geography teacher are the Commonwealth Institute and, for more specialised purposes, the Geological Museum, both in London The aim of the Commonwealth Institute is to further the interests of the Commonwealth by increasing mutual knowledge and understanding among its peoples The whole Commonwealth is shown in a series of self contained exhibitions, each of an individual country or region, each rich in up-to-date material displayed in a variety of ways The Geological Museum deals with the structure of the earth, an introduction to geological processes, the regional geology of

the British Isles and rocks and minerals of economic importance The need for a visiting class to use the museum rather than to stare aimlessly at its contents has encouraged both museums to offer teaching services The teacher may, however, prefer to organise the work for his class, and Fig 61 suggests a possible



Auckland Harbour

A port should have the following facilities

1 Docks and quays 2 Storage sheds for the produce 3 Transport—road and rail to and from the docks 4 Ship repairing and sometimes shipbuilding yards 5 Factories for processing the products, e g flour mills 6 Oil storage tanks 7 Houses for the people

Look at the model of Auckland Harbour and mark as many as possible of these things on your diagram

(Kindly contributed by Miss E Gray, Senior Geography Mistress Honor Oak School.)

Fig 61 Auckland Harbour diagram for use on visit to the Commonwealth Institute

exercise It must be stressed here that all visits should include work for children, questions devised to promote study of the museum items, drawings, puzzles and exercises for the same purpose all contrive to ensure the optimum use of the visit The completed work can sometimes be used to provide data for other classes For example, the map of Auckland, correctly labelled, is suitable for use in a second year lesson on New Zealand

Membership of the British Ship Adoption Society offers yet another contact with reality The aim of the Society is to establish communication between schools and ships sailing to all parts of

the world Through a system of correspondence, schools receive first hand information about voyages, climatic and weather conditions, ports, cargoes carried and other geographical items Masters and other members of crews often visit schools, and school parties visit ships In addition, membership permits the use of sets of colour transparencies, together with description on tape, which provide detailed information on subjects such as the Panama Canal, the Grimsby trawling fleet, and Nagasaki and Kyoto, Japan There are over forty such slide tape sets available, and the number is steadily increasing The sets, normally devised by ships' captains on their visits ashore, are made specifically for use in schools, and offer an unusual opportunity for first hand geography

There have been several suggestions in this concluding chapter We have tried to show how much interesting geographical material there is besides the orthodox facts, and to offer some sources of it We have tried to indicate by practice our precept of awareness It will take the young teacher some years to build up that fund of detail which will expand and enrich his knowledge Once acquired, it must be kept up to date

This brings us to the end of our story To draw it together in any great detail would involve repetition A major difficulty in geography teaching is to keep its parts constantly related We have tried to bear this in mind throughout There has been continual cross reference, the same topic has appeared under more than one heading This is inevitable Our main organisational pattern for schools has been an areal one, our main underlying theme the idea of geography as the discovery and explanation of the characteristics of the earth's surface Words can do no more The final synthesis must be in the mind of the teacher and, later, of his pupils

We end our book as we began, with a reference to education We have been concerned throughout with geography as a means of education We have been mainly occupied with showing how it can be used in class in a liberal way yet without loss of academic rigour Half only of a teacher's wisdom is concerned with his subject The other half involves the understanding of children Some of this can be gained from books Much more will be acquired by practice The teacher will learn the greater part of this aspect of his craft in the classroom The understanding of children is itself a life study